



# SERVICE MANUAL

WIDEBAND RECEIVER

## IC-R1

---

---

---

---

---

Downloaded by  
RadioAmateur.EU

---

## INTRODUCTION

---

This service manual describes the latest service information for the **IC-R1 WIDEBAND RECEIVER** at the time of going to press.

5 versions of the **IC-R1** have been designed. This service manual covers each version.

VERSION NUMBER	VERSION	MODEL
#02	Germany	FRG
#03	France	FRA
#05	U.S.A.	USA
#07	Australia	AUS
#08	Asia	SEA

To upgrade quality, electric parts, mechanical parts, and internal circuits are subject to change without notice or obligation.

---

## DANGER

---

**NEVER** connect the receiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the receiver.

**DO NOT** expose the receiver to rain, snow or any liquids.

**DO NOT** reverse the polarities of the power supply when connecting the receiver.

**DO NOT** apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the receiver's front end.

---

## ORDERING PARTS

---

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1110001810	IC	TA7368F	IC-R1 AF UNIT	5 pieces
8810005720	Screw	PH B0 M2×20 ZK	IC-R1 Rear panel	10 pieces

Addresses are provided on the inside back cover for your convenience.

---

## REPAIR NOTE

---

1. Make sure a problem is internal before disassembling the receiver.
2. **DO NOT** open the receiver until the receiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the receiver is defective.
6. **READ** the instructions of test equipment thoroughly before connecting equipment to the receiver.



## TABLE OF CONTENTS

<b>SECTION</b>	<b>1</b>	<b>SPECIFICATIONS</b> .....	<b>1 — 1</b>
<b>SECTION</b>	<b>2</b>	<b>INSIDE VIEWS</b> .....	<b>2 — 1</b>
<b>SECTION</b>	<b>3</b>	<b>BLOCK DIAGRAM</b> .....	<b>3 — 1</b>
<b>SECTION</b>	<b>4</b>	<b>CIRCUIT DESCRIPTION</b> .....	<b>4 — 1 ~ 5</b>
	4 - 1	GENERAL .....	4 — 1
	4 - 2	RECEIVER CIRCUITS .....	4 — 1
	4 - 3	PLL VCO CIRCUITS.....	4 — 3
	4 - 4	POWER SUPPLY CIRCUITS .....	4 — 3
	4 - 5	OTHER CIRCUITS .....	4 — 4
	4 - 6	CPU PORT ALLOCATIONS (LOGIC UNIT) .....	4 — 5
<b>SECTION</b>	<b>5</b>	<b>MECHANICAL PARTS AND DISASSEMBLY</b> .....	<b>5 — 1 ~ 2</b>
	5 - 1	FRONT PARTS .....	5 — 1
	5 - 2	CHASSIS PARTS .....	5 — 2
<b>SECTION</b>	<b>6</b>	<b>PARTS LIST</b> .....	<b>6 — 1 ~ 7</b>
<b>SECTION</b>	<b>7</b>	<b>ADJUSTMENT PROCEDURES</b> .....	<b>7 — 1 ~ 3</b>
	7 - 1	PREPARATION BEFORE SERVICING.....	7 — 1
	7 - 2	PLL ADJUSTMENT .....	7 — 2
	7 - 3	RECEIVER ADJUSTMENT.....	7 — 3
<b>SECTION</b>	<b>8</b>	<b>BOARD LAYOUTS</b> .....	<b>8 — 1 ~ 11</b>
	8 - 1	SUBORDINATE LOGIC UNITS .....	8 — 1
	8 - 2	LOGIC UNIT .....	8 — 2
	8 - 3	MAIN UNIT .....	8 — 4
	8 - 4	SUBORDINATE MAIN UNITS.....	8 — 6
<b>SECTION</b>	<b>9</b>	<b>VOLTAGE DIAGRAM</b> .....	<b>9 — 1</b>

## SECTION 1 SPECIFICATIONS

• Frequency coverage :

VERSION	FREQUENCY COVERAGE
U.S.A., Australia, Asia	100 kHz~1300 MHz
Germany	13.95~14.5 MHz, 28~29.7 MHz, 144~146 MHz, 430~440 MHz, 1240~1300 MHz
France	100 kHz~87.5 MHz, 108~1300 MHz

Specifications guaranteed 2~905 MHz

• Selectable tuning step : 0.5, 5, 8, 9, 10, 12.5, 15, 20, 25, 30, 50, 100 kHz, 1, 10 or 100 MHz

• Number of memory channels : 100

• Mode : FM, AM, Wide FM (WFM)

• Antenna impedance : 50  $\Omega$  (unbalanced)

• Power supply requirement : 7.2 V DC (internal battery)  
Optional BP-81~BP-85 or BP-90  
External DC power 6~16 V DC

• Current drain : Max. audio output : Less than 300 mA  
Power saved : Average 15 mA  
Duty cycle Receive: Standby=1: 16

• Usable temperature range : -10 °C~+60 °C; +14 °F~+140 °F

• Dimensions : 49 (W) × 102.5 (H) × 35 (D) mm  
1.9 (W) × 4.0 (H) × 1.4 (D) in  
(projections not included)

• Weight : 280 g; 9.9 oz

• Receive system : AM, FM Triple-conversion superheterodyne  
WFM Double-conversion superheterodyne

• Intermediate frequencies : 1st 266.7000~266.7095 MHz  
2nd 10.7000 MHz  
3rd 455 kHz (FM/AM only)

• Sensitivity : AM (for 10 dB S/N)  
1.6  $\mu$ V (2~24.9995 MHz)  
0.79  $\mu$ V (25~905 MHz)  
FM (for 12 dB SINAD)  
0.79  $\mu$ V (2~24.9995 MHz)  
0.4  $\mu$ V (25~905 MHz)  
WFM (for 12 dB SINAD)  
6.3  $\mu$ V (2~24.9995 MHz)  
3.16  $\mu$ V (25~905 MHz)

• Squelch sensitivity : AM 1.26  $\mu$ V (2~24.9995 MHz)  
0.63  $\mu$ V (25~905 MHz)  
FM 0.63  $\mu$ V (2~24.9995 MHz)  
0.32  $\mu$ V (25~905 MHz)

• Selectivity : AM More than 15 kHz/-6 dB  
FM More than 15 kHz/-6 dB  
WFM More than 150 kHz/-6 dB

• Audio output power : 150 mW at 10 % distortion with an 8  $\Omega$  load

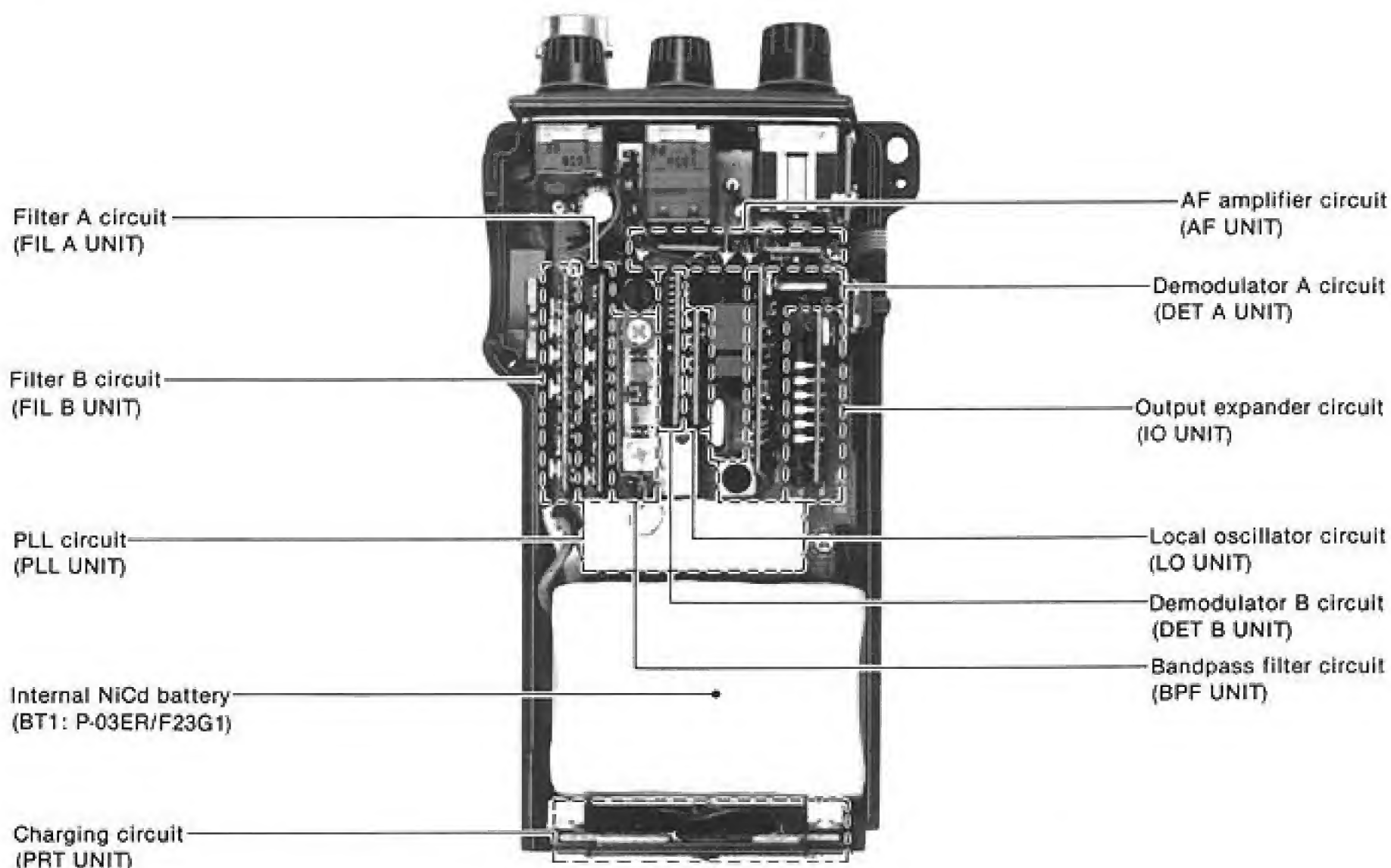
• Audio output impedance : 8  $\Omega$

All stated specifications are subject to change without notice or obligation.

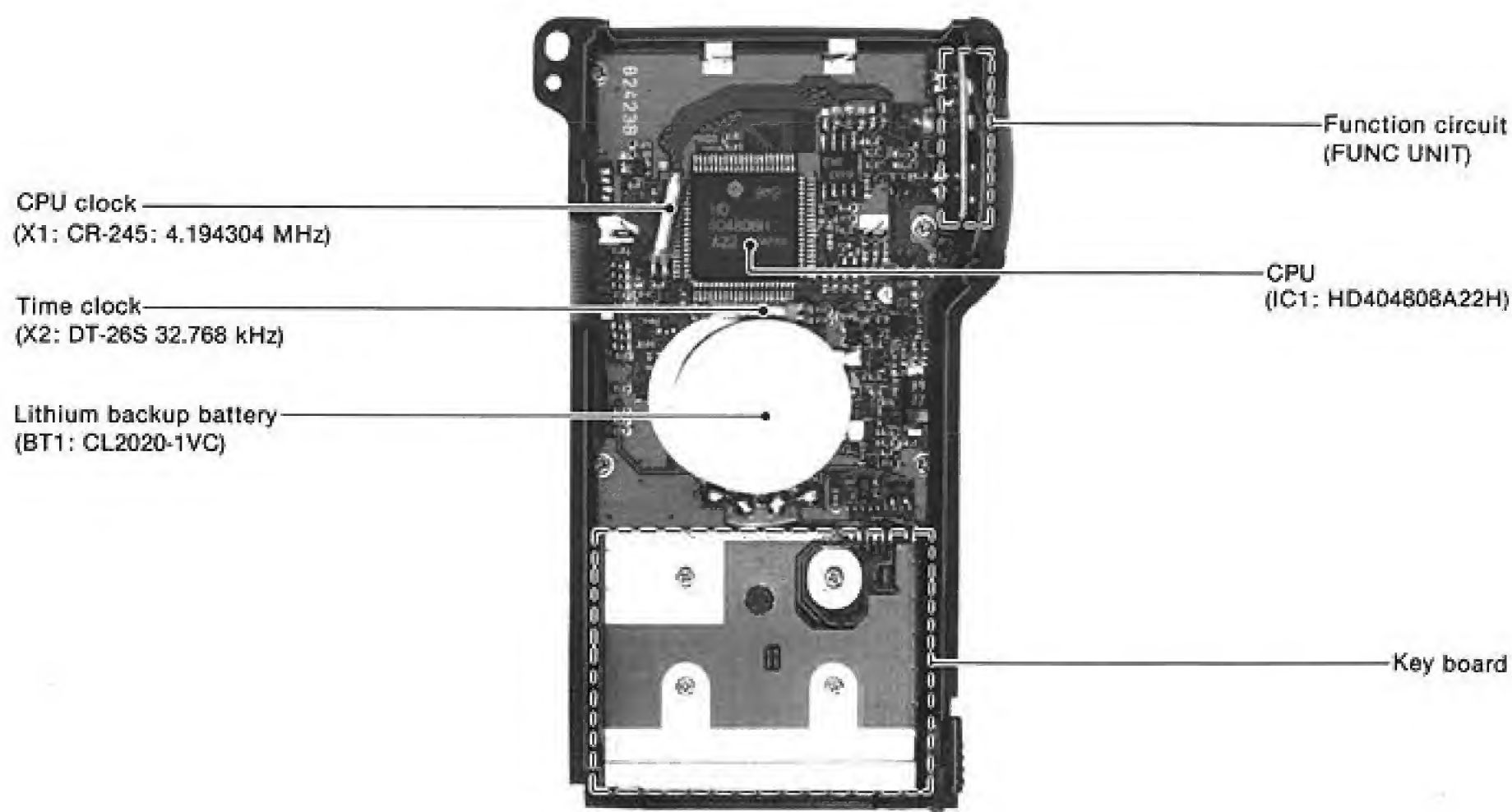
Downloaded by  
RadioAmateur.EU

## SECTION 2 INSIDE VIEWS

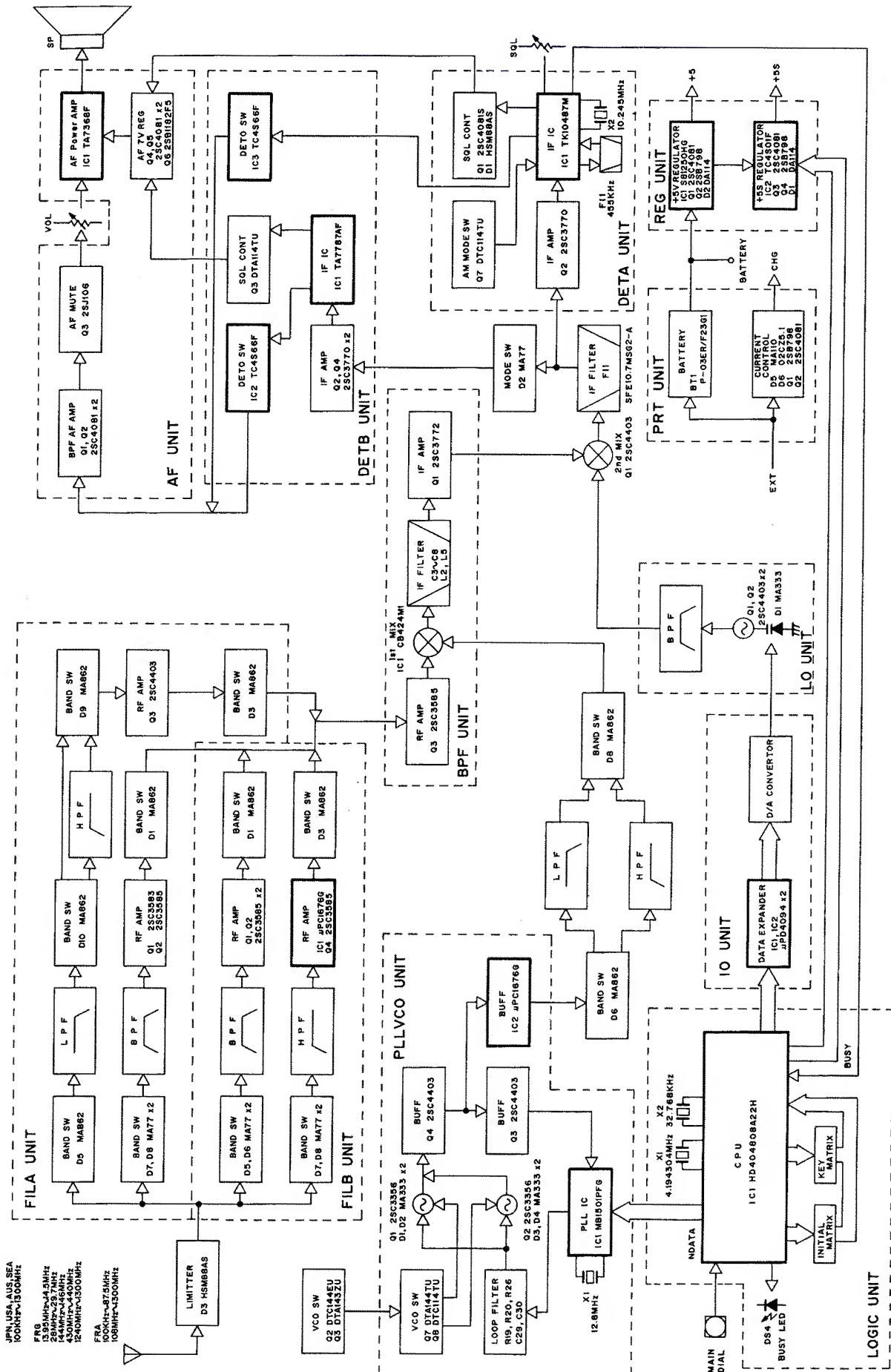
### • MAIN UNIT



### • LOGIC UNIT



## SECTION 3      BLOCK DIAGRAM





## SECTION 4

## CIRCUIT DESCRIPTION

### 4-1 GENERAL

The IC-R1 is designed for the following bands (0.1~1300 MHz) and modes (AM, FM, WFM).

### 4-2 RECEIVER CIRCUITS

#### 4-2-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

Received signals enter an antenna connector and pass through a limiter (D3). The signals are applied to band switching circuits on FIL A (0.1~534.0 MHz) and FIL B (534.0~1300 MHz) UNITS which suppress out-of-band signals.

#### 4-2-2 RF CIRCUITS (FIL A AND B.P.F UNITS)

##### (1) 0.1~266.7 MHz

RF signals from a band switch (D5) pass through a low-pass filter (C17~C21, L7~L9). The filtered signals switch a band switching circuit (D9, D10). The filtered signals below 2.0 MHz are applied to an RF amplifier (Q3). The filtered signals above 2.0 MHz pass through a high-pass filter (C27~C31, L11, L12) and enter the RF amplifier (Q3). The signals are applied to the RF amplifier (Q3) on the B.P.F UNIT via a band switch (D3).

##### (2) 266.7~534.0 MHz

RF signals from a band switching circuit (D7, D8) pass through a bandpass filter (C5, C7~C12, C14, C15, L1~L6). The filtered signals are applied to RF amplifiers (Q1, Q2). The signals are applied to the RF amplifier (Q3) on the B.P.F UNIT via a band switch (D1).

#### 4-2-3 RF CIRCUITS (FIL B AND B.P.F UNITS)

##### (1) 534.0~801.0 MHz

RF signals from a band switching circuit (D5, D6) pass through a bandpass filter (C6~C9, C11~C14, L2~L5, L7). The filtered signals are amplified at RF amplifiers (Q1, Q2). The signals are applied to the RF amplifier (Q3) on the B.P.F UNIT via a band switch (D1).

#### • RECEIVER CIRCUIT BLOCK DIAGRAM (FIL A, FIL B UNITS)

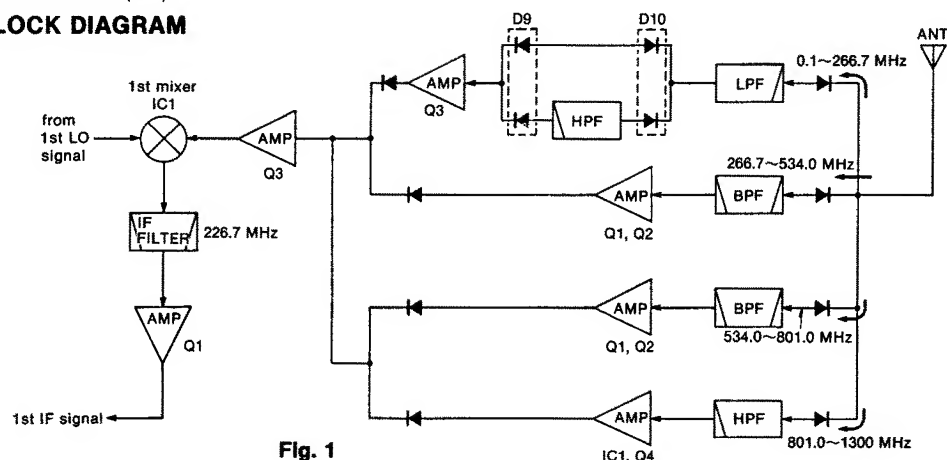


Fig. 1

##### (2) 801.0~1300 MHz

RF signals from a band switching circuit (D7, D8) pass through a high-pass filter (C22~C25, L9~L11). The filtered signals are amplified at an RF amplifier (Q4) and are then re-amplified at IC1 which functions as a wideband amplifier. The signals are applied to the RF amplifier (Q3) on the B.P.F UNIT via the band switch (D3).

#### 4-2-4 1ST MIXER CIRCUIT AND 1ST IF CIRCUITS (B.P.F UNIT)

The output signals from the FIL A and FIL B are amplified at the RF amplifier (Q3). The amplified signals are mixed with a 1st LO signal from the PLL VCO UNIT at a 1st mixer (IC1) to produce a 226.7 MHz 1st IF signal.

The 1st IF signal is applied to an IF filter (C3~C8, L2, L5) to suppress out-of-band signals. The 1st IF signal is amplified at an IF amplifier (Q1) and then applied to the 2nd mixer (Q1) on the MAIN UNIT.

#### 4-2-5 2ND MIXER CIRCUIT AND 2ND IF CIRCUITS (MAIN UNIT)

The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal.

The 1st IF signal from the IF amplifier (Q1) on the B.P.F UNIT is applied to the 2nd mixer (Q1) and mixed with a 256 MHz 2nd LO signal from the LO UNIT at the 2nd mixer (Q1) to be converted to a 10.7 MHz 2nd IF signal. The 2nd IF signal is applied to an IF filter (FI1) to suppress out-of-band signals. In WFM mode, the filtered signal passes through a mode switch (D2) and is applied to IF amplifiers (Q2, Q4) on the DET B UNIT. In other bands, the filtered signal is applied to an IF amplifier (Q2) on the DET A UNIT.

#### 4-2-6 3RD IF AND DEMODULATOR CIRCUITS (DET A UNIT)

The 3rd mixer circuit converts the 2nd IF signal to a 3rd IF signal.

The 2nd IF signal from the IF amplifier (Q2) is applied to the 3rd mixer section of IC1 and is mixed with a 3rd LO signal to be converted to a 455kHz 3rd IF signal.

IC1 contains the 3rd mixer, local oscillator, limiter amplifier and quadrature detector circuits. The local oscillator section and X2 generate 10.245MHz for the 3rd LO signal.

A 3rd IF signal from the 3rd mixer (IC1, pin 4) passes through a ceramic filter (F1), where unwanted signals are suppressed. It is then amplified at the limiter amplifier section (IC1, pin 6) and applied to the quadrature detector section (IC1, pin 10 and ceramic discriminator X1) to demodulate the 3rd IF signal into an AF signal.

The AF signal output from IC1 (pin 11) is applied to a squelch circuit and de-emphasis circuit. This de-emphasis circuit (R7, C24, C25) is an integrated circuit with frequency characteristics of  $-6$  dB/octave. The resulting signal passes through IC2 which functions as a switch and is applied to the DET B UNIT. The AM signal from IC1 (pin 12) is amplified at Q3 and is converted to an AF signal and is then applied to a detector switch (IC3) on the DET B UNIT.

#### 4-2-7 WFM DEMODULATOR CIRCUIT (DET B UNIT)

The 2nd IF signal from a mode switch (D2) is applied to the IF amplifiers (Q2, Q4). The signal is applied to a quadrature detector section and level detector section of IC1.

IC1 is a WFM band detector which contains an IF amplifier, quadrature detector circuits, level detector and LED driver.

The 2nd IF signal is demodulated into an AF signal at the quadrature detector section of IC1. The AF signal output from IC1 (pin 9) is applied to a detector switch (IC2) and then applied to AF amplifiers (Q1, Q2) on the AF UNIT. The AF signal from IC3 is also applied to AF amplifiers (Q1, Q2).

#### • FM DEMODULATOR CIRCUIT

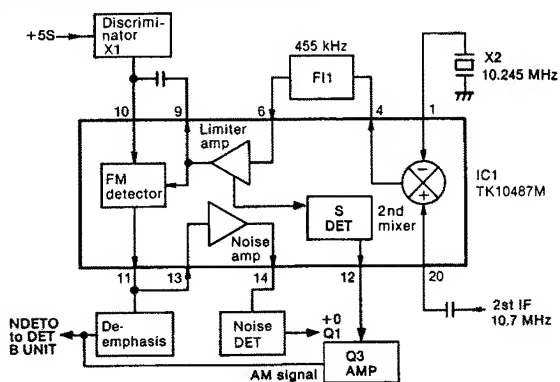


Fig. 2

#### 4-2-8 AF AMP CIRCUIT (AF AND VR UNITS)

The AF signal is applied to bandpass AF amplifiers (Q1, Q2) on the AF UNIT. Q1 is an active filter that functions as a high-pass filter to suppress tone signals for the tone squelch operation. Q2 is also an active filter to suppress high noise signals.

The filtered signal is applied to the [VOL] control (R1) on the VR UNIT via an AF mute switch (Q3). When the squelch is closed, Q3 cuts the AF signal as the AF mute switch. The AF signal is power-amplified at the AF power amplifier (IC1) to drive a speaker.

The AF regulators (Q4~Q6, D1) supply a power source to an AF power amplifier (IC1). An AF ON signal from the MAIN UNIT controls Q6 and mutes AF output while receiving no signal.

#### 4-2-9 SQUELCH CIRCUIT (DET A AND DET B UNITS)

A squelch circuit cuts out AF signals when no RF signal is received. By detecting noise components in the AF signals, the squelch circuit switches the AF power amplifier.

When operating on the WFM band, the squelch circuit on the DET B UNIT is activated. When operating on another band, the squelch circuit on the DET A UNIT is activated.

Some of the noise components in the AF signal from IC1 (pin 11) are selected on the DET A UNIT and then are applied to IC1 (pin 13) via R8, C11, C13 and C14. The [SQL] control (R2) on the VR UNIT adjusts the IC1 (pin 13) input level.

The active filter section in IC1 amplifies noise components of frequencies of 20 kHz and above, and outputs the resulting signals from pin 14. Output signals are rectified by D1 and are converted to DC voltage.

The rectified voltage triggers the squelch switch (Q1). The collector of Q1 outputs the squelch signal. The signal is applied to the CPU (IC1, pin 1) on the LOGIC UNIT through the BUSY signal line. The CPU outputs the BUSY LED signal.

The AF signal activates the AF mute circuit (Q3) on the AF UNIT. The BUSY LED signal is applied to Q1 on the LOGIC UNIT, turning OFF the receive indicator.

Some of the noise components in the AF signal from IC1 (pin 16) are detected at the level detector section of IC1 on the DET B UNIT and are then amplified at the LED driver section. The output signal from IC1 (pin 7) is applied to a squelch control (Q3) and is then applied to AF regulators (Q4~Q6).



## 4-3 PLL VCO CIRCUITS

### 4-3-1 GENERAL (PLL VCO UNIT)

The PLL circuit, using a one chip modulus prescaler (IC1), directly generates the 1st LO frequencies with 2 VCO oscillators (Q1, Q2, D1~D4). The modulus prescaler (IC1) sets the dividing ratio based on serial data from the CPU on the LOGIC UNIT and compares the phases of VCO signals and the reference oscillator frequency. It detects the out-of-step phase and outputs it. The reference frequency is oscillated at X1 on the PLL VCO UNIT.

### 4-3-2 VCO CIRCUIT(MAIN AND PLL UNITS)

IC-R1 contains 2 VCO circuits depending on the frequency coverages for receiving. Two VCO switches (Q2, Q3) on the MAIN UNIT generate signals.

#### (1) 266.8~385 MHz

When a "LOW" signal is applied to a VCO switch (Q7) through a VCOC signal line, Q1 oscillates 266.8~385 MHz. Varactor diodes (D1, D2) control the oscillated frequency from the VCO (Q1).

#### (2) 385~534 MHz

When a "High" signal is applied to a VCO switch (Q8) through a VCOC signal line, Q2 oscillates 385~534 MHz. Varactor diodes (D3, D4) control the oscillated frequency from the VCO (Q2).

### 4-3-3 LOOP FILTER CIRCUIT (PLL VCO UNIT)

Phase-detected signals from IC1 (pin 5) are converted to DC voltage by a lag-lead loop filter (R19, R20, R26, C29, C30).

DC voltage (PLL lock voltage) is provided through a buffer amplifier (Q4). The buffer amplifier (Q4) distributes the DC voltage to buffer amplifiers (Q3, IC2).

The output from the buffer amplifier (Q3) is applied to IC1 (pin 8) and is then applied to the lag-lead loop filter (R19, R20, R26, C29, C30) from IC1 (pin 5).

#### • PLL VCO UNIT

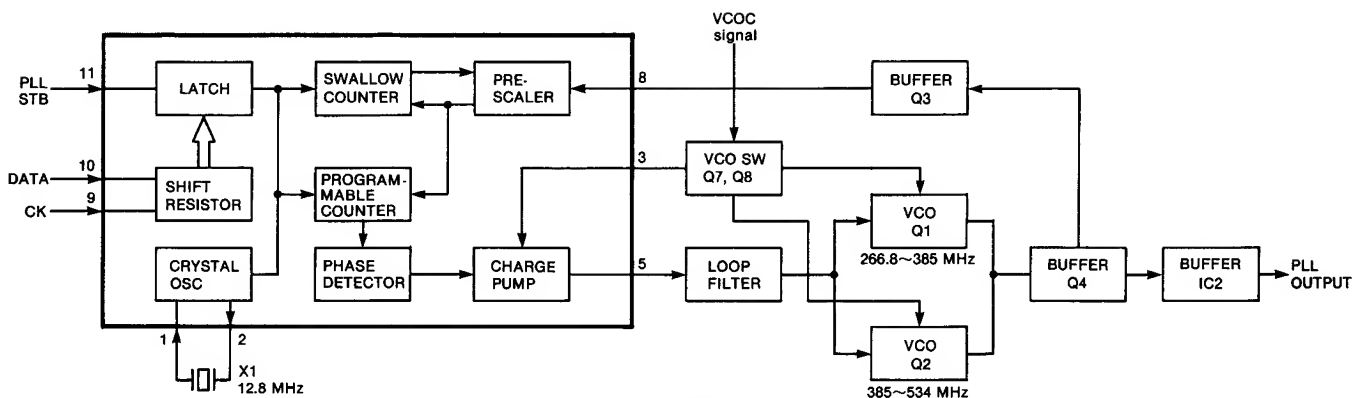


Fig. 3

The 1st LO signal output from IC2 is applied to a band switch (D6) through a LO OUT signal line and is then applied to a low-pass filter (C25~C27, L3) or a high-pass filter (C21, C23, C24, L4). The filtered signal is applied to a band switch (D8) and then applied to the 1st mixer (IC1) on the B.P.F. UNIT.

## 4-4 POWER SUPPLY CIRCUITS

### 4-4-1 VOLTAGE LINES

LINE	DESCRIPTION
HV	The external DC power from the DC power connector.
Vcc	The internal or attached battery pack voltage or external DC power passed through the power switch.
+5	Common 5V converted from the Vcc line at Q1 and Q2 on the REG UNIT using IC1 output as the reference voltage.
+5S	5V controlled by the power saver function. This voltage is converted from Vcc line at Q3 and Q4 on the REG UNIT using IC2 output as the reference voltage.

### 4-4-2 CPU POWER SUPPLY CIRCUIT (LOGIC UNIT)

When the internal or attached battery pack is discharged, voltage is applied to the CPU (IC1, pin 73) via R23 from the lithium backup battery (BT1) to provide backup for the memory contents.

The internal, attached battery pack voltage or external DC power is applied to the current regulator (Q3, D2) to charge BT1.

#### 4-4-3 +5S SWITCHING CIRCUIT (REG UNIT)

The IC-R1 has a power saver to reduce current consumption to approx. 1/16.

The PSC (Power Saver Control) signal is applied to IC2. IC2 controls +5S regulator (Q3, Q4, D1) to turn ON and OFF +5S voltage.

#### 4-4-4 CHARGING CIRCUIT (PRT UNIT)

Voltage from the [DC 13.8V] jack is applied to the current control circuit (Q1, Q2, D5, D6) to charge an internal or attached battery pack (except the BP-85).

When the external battery pack is attached, the current from D2 charges the attached battery pack. When the external battery pack is removed, the current from D2 charges the internal battery pack.

The IC-R1 has an external battery switch. When a battery pack is attached, this switch connects the external battery to the charging circuit.

### 4-5 OTHER CIRCUITS

#### 4-5-1 S/RF INDICATOR CIRCUIT (DET A, MAIN AND LOGIC UNITS)

A portion of the AM signal is output as an S-indicator signal from IC1 (pin 12) on the DET A UNIT via an S signal line. The S-indicator signal is applied to IC2b (pin 5) on the LOGIC UNIT.

IC2b (pin 6) receives an S-indicator reference signal from the terminals of CPU KEYS0~3 via the D/A converter (R11, R45~R48). The CPU terminals increase the reference signal level.

When the D/A converted level becomes greater than the S-indicator level, IC2b (pin 7) becomes "LOW." The CPU detects the signal strength level using the terminal output from KEYS0~3 and indicates the signal strength level on the function display when receiving the "LOW" signal.

##### • S INDICATOR CIRCUIT

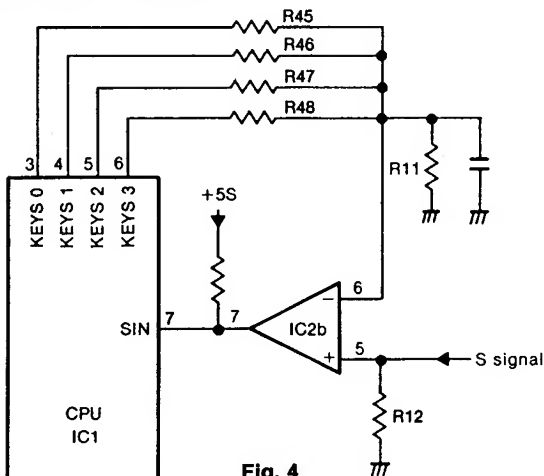


Fig. 4

#### 4-5-2 DISPLAY BACKLIGHT CIRCUIT (LOGIC UNIT)

When the [LIGHT] switch is pushed, pin 77 of the CPU outputs "HIGH." The signal is applied to Q1 to light up the backlight LEDs (DS2, DS3).

#### 4-5-3 CPU RESET CIRCUIT (LOGIC UNIT)

IC3 detects +5 voltage. When the +5 voltage line reaches 5V, IC3 becomes "HIGH" and the CPU (IC1) restarts operation.

The CPU is reset when IC1 (pin 76) becomes "HIGH." The AND gate IC (IC4) outputs a reset signal when both input terminals are "HIGH." One terminal is "HIGH" when the [FUNCTION] switch is pushed, and the other (INT0 line) is "HIGH" when the power is turned ON.

##### • RESET CIRCUIT

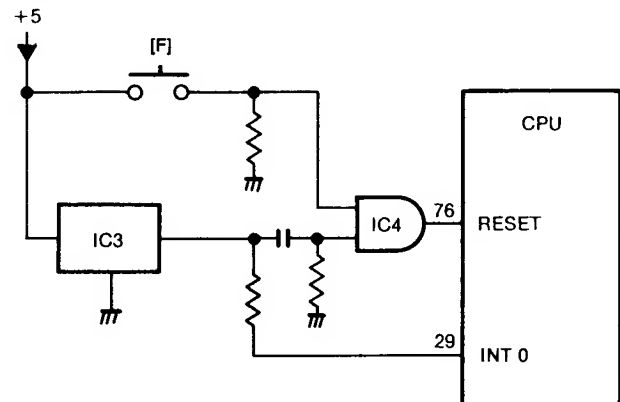


Fig. 5

#### 4-5-4 RECEIVE INDICATOR CIRCUIT (LOGIC UNIT)

The indicator lights up in green as the busy indicator while the squelch opens using CPU (IC1, pin 78) output via the inverter (Q2).

#### 4-5-5 CLOCK OSCILLATOR CIRCUIT (LOGIC UNIT)

IC1 oscillates the 32.768 kHz clock signal for the time clock using X2.

## 4-6 CPU PORT ALLOCATIONS (LOGIC UNIT)

### • INPUT PORT

PORT NUMBER	PIN NUMBER	DESCRIPTION
D4 [BUSY]	1	Detects a squelch signal. The signal is "HIGH" when the squelch opens.
D10 [SIN]	7	Inputs S-meter-compared signal from IC2b to indicate the CPU counting level to the S-indicator in the function display.
D12, D13 [DIAL UP/DN]	9, 10	Input port for the up/down signal of the tuning control.
R10~R13 [KEY10~KEY13]	19~22	These are input ports for the initial and key matrices.
R20~R23 [KEYR0~KEYR3]	23~26	These are input ports for the keyboard.
R32 [INT0]	29	Detects a signal for the standby mode of the CPU. The CPU enters the standby mode when the port becomes "LOW."

### • OUTPUT PORT

PORT NUMBER	PIN NUMBER	DESCRIPTION
D0 [LAMP0]	77	Becomes "HIGH" when the backlight LEDs light up.
D1 [BUSY LED]	78	Outputs a signal for lighting up the receive indicator in green. This port becomes "LOW" while receiving when the squelch opens.
D6~D9 [KEYS0~KEYS3]	3~6	Outputs a strobe signal for the keyboard, for the initial and key matrices, and for the D/A converter counting signal alternately in an interval.
R00 [SCK]	15	Outputs clock signals for serial data.
R01 [IOSTB]	16	Outputs a strobe signal for serial data to the expander ICs.
R02 [SDATA]	17	Outputs serial data synchronized with the DATA signal.
R03 [PLSTB]	18	Outputs a strobe signal for serial data to the PLL IC.

### • OUTPUT EXPANDER (IO UNIT, IC1)

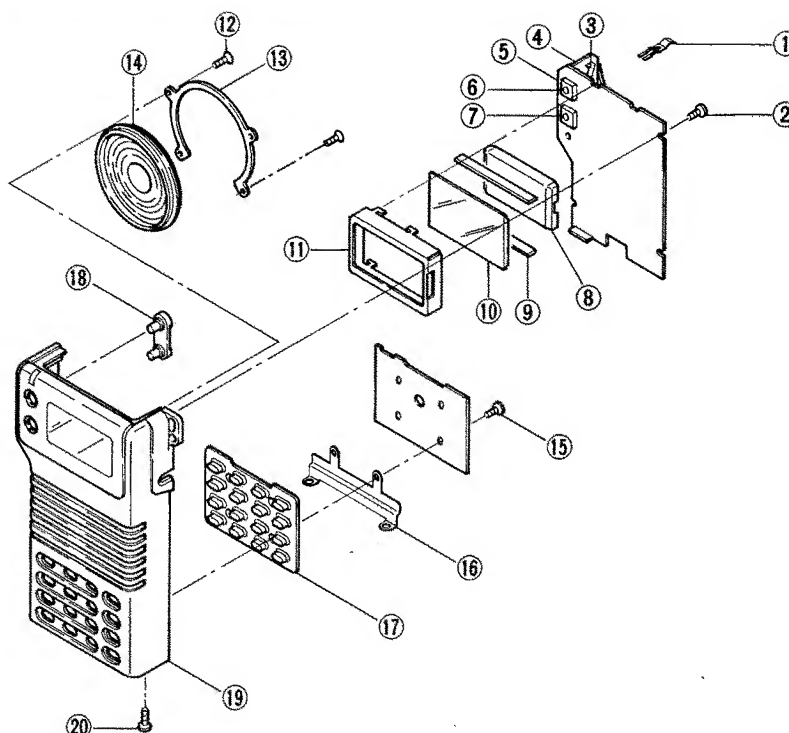
PORT NUMBER	PIN NUMBER	DESCRIPTION
Q1~Q5 [DA1~DA5]	4~7, 14	For output signals which are applied to the D/A converter(R3~R12).
Q6 [FMW]	13	Output signals to control Q2,Q4 on the DET B UNIT.
Q7 [FMN]	12	Output signal to control Q6 on the LOGIC UNIT.
Q8 [AM]	11	Output signal to control Q7 on the DET A UNIT.

### • OUTPUT EXPANDER (IO UNIT, IC2)

PORT NUMBER	PIN NUMBER	DESCRIPTION
Q1,Q2 [B1,B2]	4, 5	Outputs a control signal for the FIL A UNIT.
Q3,Q4 [B3,B4]	6, 7	Outputs a control signal for the FIL B UNIT.
Q5 [B5]	14	Outputs a control signal for the MAIN UNIT(Q4,Q5).
Q6 [VCO1]	13	Outputs a control signal for the MAIN UNIT(Q3).
Q7 [AF MUTE]	12	Output a receive mute signal for the AF UNIT(Q3).
Q8 [AFON]	11	Output a receive mute signal for the AF power amplifier.

## SECTION 5 MECHANICAL PARTS AND DISASSEMBLY

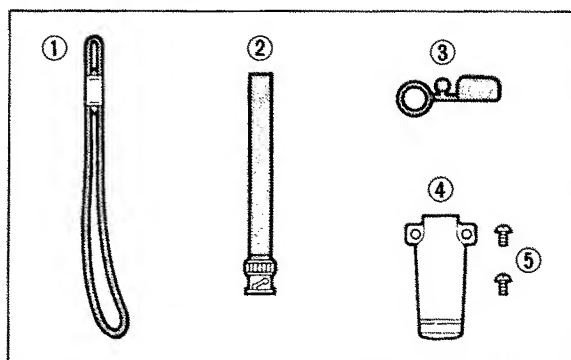
### 5-1 FRONT PARTS



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8930016400	756 LOGIC ground spring plate	2	⑪	8930015960	756 LCD holder	1
②	8810001700	Screw PH B0 NO.0-3 M1.4 × 3	4	⑫	8810005740	Screw FH B0 No.0 M2 × 3	4
③	8930014880	752 P.C. Board holder	1	⑬	8930014810	752 Speaker plate	1
④	2230000770	Switch [W] SW-104 (SKHUPE004B)	1	⑭	2510000450	Speaker EAS-3P123D	1
⑤	2230000770	Switch [F] SW-104 (SKHUPE004B)	1	⑮	8810001700	Screw PH B0 No.0-3 M1.4 × 3	4
⑥	2260001150	Switch [CONT] SW-103 (SKHUPC007B)	1	⑯	8510006050	Key shield	1
⑦	2260001150	Switch [MONI] SW-103 (SKHUPC007B)	1	⑰	8010009730	756 Keyboard (A)	1
⑧	8010009070	756 Reflector plate	1	⑱	8610005970	Knob K138 [CONT],[MONI]	2
⑨	8930019700	LCD contact strip SRCN-754	2	⑲	8210005711	756 Front panel(G)-1 (incl.Front plate and 756 lens)	1
⑩	5030000540	LCD LD-B9487J (incl.shield)	1	⑳	8810005890	Screw FH M2 × 4 ZK	2

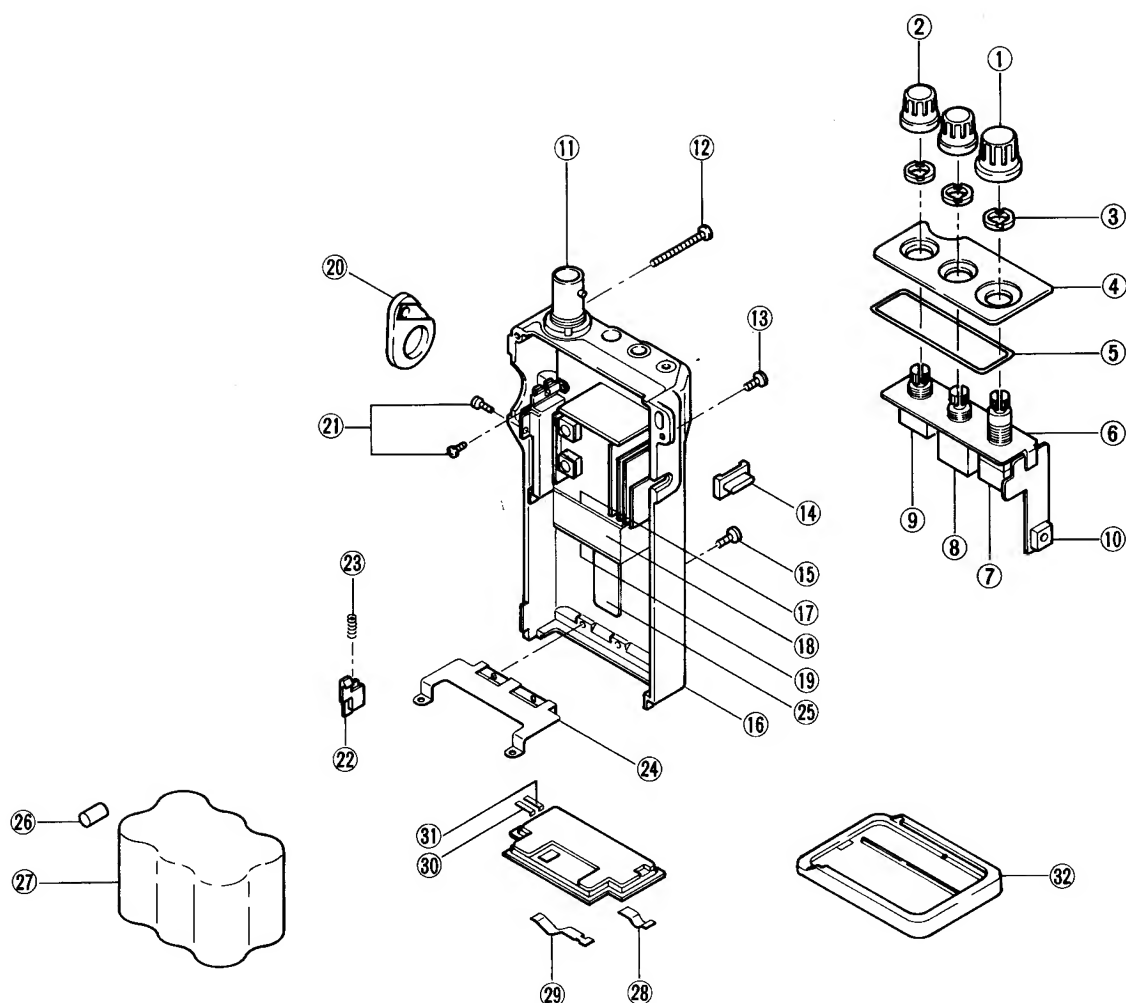
**Screw abbreviations** PH: Pan head B0: Self-tapping screw ZK: Black

### • ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8010008970	Handstrap HK-002	1
②	Optional product	FA-4B FLEXIBLE ANTENNA	1
③	8930014961	752 Rainproof cap-1	1
④	8010008620	752 Belt clip	1
⑤	8810005730	Screw BuH M3 × 3 ZK BS	2

## 5-2 CHASSIS PARTS



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8610005790	Knob N147 [TUNING]	1	⑮	8810005890	Screw FH M2 × 4 ZK	2
②	8610005780	Knob N146 [SQUELCH],[PWR/VOL]	2	⑯	8010009721	756 Rear panel (A)-5	1
③	8830000550	VR nut (E)	3	⑰	8510006480	871 PLL case cover	1
④	8210005571	756 Top panel (A)-1	1	⑱	8510006460	871 PLL case	1
⑤	8930014950	752 Top seal	1	⑲	8510006470	871 PLL case cover (A)	1
⑥	8930014801	752 VR plate-1	1	⑳	8930017680	756 PTT (A) switch rubber	1
⑦	2260000890	Rotary switch [TUNING] SRBM1L040A	1	㉑	8810005860	Screw PH No.0 M2 × 3 Ni	4
⑧	7210001440	Variable resistor [PWR/VOL] RK097111101NA (10KA)	1	㉒	8930014922	752 Release button-2	1
⑨	7210001450	Variable resistor [SQUELCH] RK0971110051A (10KB)	1	㉓	8930014820	Release spring (M)	1
⑩	2260001150	Switch [LIGHT] SW-103 (SKHUPC007B)	1	㉔	8930015980	Joint plate	1
⑪	6510011350	Antenna connector BNC-RM-F	1	㉕	8930016570	756 BP holder plate	1
⑫	8810005720	Screw PH B0 M2 × 20 ZK	2	㉖	8930016590	BP rubber	1
⑬	8810000100	Screw PH M2 × 4 ZK	1	㉗	3030000270	NiCd battery P-03ER/F23G1	1
⑭	8930014911	Light switch-1 rubber	1	㉘	8930014852	752 Battery terminal-2	3
				㉙	8930016583	756 C terminal-3	1
				㉚	8930016970	756 A contact	1
				㉛	8930016980	756 B contact	1
				㉜	Optional product	BOTTOM CAP-2	1

**Screw abbreviations** PH: Pan head FH: Flat head B0: Self-tapping screw ZK: Black Ni: Nickel

# SECTION 6 PARTS LIST

## [LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001320	IC	HD404808A22H
IC2	1120000430	IC	LA6393M-TP-T1
IC3	1180000610	IC	RH5VA42CA-T1
IC4	1130003760	IC	TC4S81F (TE85R)
Q1	1530002060	Transistor	2SC4081 T107 R
Q2	1590000720	Transistor	DTA144EU T107
Q3	1560000540	FET	2SK880-Y (TE85R)
Q4	1530002060	Transistor	2SC4081 T107 R
Q5	1590000430	Transistor	DTC144EU T107
Q6	1590000660	Transistor	DTC144TU T107
Q7	1510000670	Transistor	2SA1588-GR (TE85R )
Q8	1590000430	Transistor	DTC144EU T107
D1	1730002160	Zener	02CZ5.1-Z (TE85R)
D2	1160000060	Diode	DAN202U T107
D3	1750000130	Diode	DA204U T107
D4	1160000050	Diode	DAP202U T107
D5	1160000060	Diode	DAN202U T107
D6	1750000120	Diode	DWA010-TE
D7	1750000120	Diode	DWA010-TE
D8	1160000060	Diode	DAN202U T107
D9	1160000060	Diode	DAN202U T107 (FRG, FRA)
D10	1750000160	Diode	DA114 T107 (FRA)
	1750000170	Diode	DA115 T107 (USA, AUS, SEA)
D11	1790000590	Diode	MA110 (TW)
X1	6050005090	Crystal	CR-245
X2	6050005800	Crystal	DT-26S 32.768KHz
R1	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R2	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R3	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R4	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R5	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R6	7030003930	Resistor	ERJ3GEYJ 334 V (330 kΩ)
R7	7030003910	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R8	7030003910	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R9	7030003920	Resistor	ERJ3GEYJ 244 V (240 kΩ)
R10	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R11	7030003570	Resistor	ERJ3GEYJ 123 V (12 kΩ)
R12	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R13	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R14	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 kΩ)
R15	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R16	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R17	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R18	7030003580	Resistor	ERJ3GEYJ 153 V (15 kΩ)
R20	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R21	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R22	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R23	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R24	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R25	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R27	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R28	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R29	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R30	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R31	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R32	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R33	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R34	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R35	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R37	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)

## [LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R38	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R39	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R40	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R41	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R42	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R43	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R44	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R45	7030003790	Resistor	ERJ3GEYJ 824 V (820 kΩ)
R46	7030003750	Resistor	ERJ3GEYJ 394 V (390 kΩ)
R47	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R48	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R49	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R50	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R51	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R52	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R53	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R54	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R55	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R56	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R57	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R58	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R59	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C2	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C3	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C4	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C5	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C6	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C7	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C8	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C9	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C10	4030006640	Ceramic	C1608 SL 1H 180J- T-A
C11	4030006640	Ceramic	C1608 SL 1H 180J- T-A
C12	4030007030	Ceramic	C1608 CH 1H 150J- T-A
C13	4030007030	Ceramic	C1608 CH 1H 150J- T-A
C14	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C15	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C16	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C17	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C18	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C19	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C20	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C21	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C22	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C23	4550000770	Tantalum	TESVC 0J 226M-12L
C24	4030006860	Ceramic	C1608 JB 1H 102K- T-A
DS1	5030000540	LCD	LD-B9487J (E-5133)
DS2	5040000880	LED	SLM-13MWS T97B
DS3	5040000880	LED	SLM-13MWS T97B
DS4	5040001110	LED	SLM-23VMWS T97B
S1	2230000770	Switch	SW-104 (SKHUPE004B) [W]
S2	2230000770	Switch	SW-104 (SKHUPE004B) [F]
S3	2260001150	Switch	SW-103 (SKHUPC007B) [LIGHT]
S4	2260001150	Switch	SW-103 (SKHUPC007B) [CONT]
S5	2260001150	Switch	SW-103 (SKHUPC007B) [MONI]
S6	2260000890	Encoder	SRBM1L040A [TUNING]



# [LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
SP1	2510000450	Speaker	EAS-3P123D
BT1	3020000160	Lithium Battery	VL2020-1VC
EP1	0910025212	P.C. Board	B 2423B (LOGIC)
EP2	0910022754	P.C. Board	B 2201D (LOGIC C)
EP3	0910023513	P.C. Board	B 2291C (CONNECTOR)
EP4	0910021322	P.C. Board	B 2108B (LOGIC→MAIN)
EP5	0910021912	P.C. Board	B 2111B (ENC→LOGIC)
EP6	0910025000	P.C. Board	B 2426 (ENC)
EP7	0910025011	P.C. Board	B 2427A (FUNC)
EP8	8930019700	LCD contact strip	SRCN-754

# [VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210001440	Variable Resistor	RK097111101NA (10KA) [PWR/VOL]
R2	7210001450	Variable Resistor	RK0971110051A (10KB) [SQL]
C1	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C2	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C3	4510002650	Electrolytic	16 MS7 100 µF
EP1	0910025021	P.C. Board	B 2428A (VR)

Downloaded by  
RadioAmateur.EU

# [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002560	Transistor	2SC4403-3-TR
Q2	1590000430	Transistor	DTC144EU T107
Q3	1590000440	Transistor	DTA143ZU T107
Q4	1590000430	Transistor	DTC144EU T107
Q5	1590000720	Transistor	DTA144EU T107
Q6	1590000720	Transistor	DTA144EU T107
D2	1790000620	Diode	MA77 (TW)
D3	1790000490	Diode	HSM88AS-TR
D4	1790000450	Diode	MA862 (TX)
D6	1790000450	Diode	MA862 (TX)
D7	1790000680	Diode	SB20-03P-TD
D8	1790000450	Diode	MA862 (TX)
D11	1160000060	Diode	DAN202U T107
D12	1750000130	Diode	DA204U T107
D13	1790000640	Varicap	MA363B (TX)

# [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D14	1790000450	Diode	MA862 (TX)
D15	1790000450	Diode	MA862 (TX)
X1	6050006650	Crystal	CR-314
F11	2020000700	Ceramic Filter	SFE10.7MS2G-A
L1	6150002700	Coil	LS-272
L3	6200000090	Coil	LQN 2A 18NM
L4	6200000100	Coil	LQN 2A 22NM
L5	6150002930	Coil	LS-287
L6	6150003530	Coil	LS-392
R2	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R4	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R6	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R7	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 kΩ)
R8	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 kΩ)
R10	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R11	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R12	7030003350	Resistor	ERJ3GEYJ 181 V (180 Ω)
R14	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R15	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R16	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 kΩ)
R17	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R19	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R20	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R21	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R25	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R26	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R27	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R28	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
C2	4030006740	Ceramic	C1608 SL 1H 820J- T-A
C3	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C4	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C5	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C6	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C7	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C8	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C9	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C11	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C12	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C13	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C14	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C15	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C16	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C17	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C18	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C19	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C21	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C23	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C24	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C25	4030006570	Ceramic	C1608 SL 1H 060D- T-A
C26	4030006570	Ceramic	C1608 SL 1H 060D- T-A
C27	4030006570	Ceramic	C1608 SL 1H 060D- T-A
C28	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C29	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C30	4550002890	Tantalum	TESVA 1A 225M1-8L
C31	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C32	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C33	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C34	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C35	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C36	4550000460	Tantalum	TESVA 1C 105M1-8L
C37	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C38	4030006900	Ceramic	C1608 JB 1E 103K- T-A

## [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C39	4030006900	Ceramic	C1608 JB 1E 103K- T-A
C40	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C41	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C42	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C43	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C44	4030006610	Ceramic	C1608 SL 1H 100D- T-A
EP1	0910025204	P.C. Board	B 2412D (MAIN)

## [AF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C20	4550002950	Tantalum	TESVA 0J 335M1-8L
C21	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
EP1	0910025402	P.C. Board	B 2413B (AF)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

## [AF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001810	IC	TA7368F (TP1)
Q1	1530002060	Transistor	2SC4081 T107 R
Q2	1530002060	Transistor	2SC4081 T107 R
Q3	1590000520	FET	2SJ106-GR (TE85R)
Q4	1520000270	Transistor	2SB1182 T201 Q
Q5	1530002060	Transistor	2SC4081 T107 R
Q6	1530002060	Transistor	2SC4081 T107 R
D1	1160000050	Diode	DAP202U T107
R1	7030003580	Resistor	ERJ3GEYJ 153 V (15 kΩ)
R2	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R3	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R4	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R5	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R6	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R7	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R8	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R9	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R10	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R13	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R14	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R15	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R16	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R18	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R19	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R20	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R21	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R22	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
C1	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C2	4030006900	Ceramic	C1608 JB 1E 103K- T-A
C3	4030006870	Ceramic	C1608 JB 1H 222K- T-A
C4	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C5	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C6	4030005110	Ceramic	C2012 JB 1E 473K- T-A
C7	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C10	4510001340	Electrolytic	10 MS5 33 μF
C11	4030005110	Ceramic	C2012 JB 1E 473K- T-A
C12	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C13	4510003180	Electrolytic	6.3 RC2 100 μF (D=5.0)
C14	4550003030	Tantalum	TEMSVA 0J 475M-8L
C15	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C16	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C17	4030005100	Ceramic	C2012 JB 1H 273K- T-A
C19	4030006710	Ceramic	C1608 SL 1H 470J- T-A

## [LO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002560	Transistor	2SC4403-3-TR
Q2	1530002560	Transistor	2SC4403-3-TR
D1	1790000530	Varicap	MA333(TW)
L1	6200000130	Coil	LQN 2A 47NM
L2	6200000100	Coil	LQN 2A 22NM
L3	6200000100	Coil	LQN 2A 22NM
L4	6200000100	Coil	LQN 2A 22NM
L5	6200000100	Coil	LQN 2A 22NM
R1	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R2	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R3	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R5	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R6	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R7	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
C1	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C2	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C3	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C4	4030008230	Ceramic	C1608 UJ 1H 080D- T-A
C5	4030008240	Ceramic	C1608 UJ 1H 100D- T-A
C6	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C7	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C8	4030008210	Ceramic	C1608 UJ 1H 060D- T-A
C9	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C10	4030006610	Ceramic	C1608 SL 1H 100D- T-A
C11	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C12	4030006630	Ceramic	C1608 SL 1H 150J- T-A
C13	4030006560	Ceramic	C1608 SL 1H 050C- T-A
C14	4030006590	Ceramic	C1608 SL 1H 080D- T-A
C15	4030006660	Ceramic	C1608 SL 1H 220J- T-A
C16	4030006570	Ceramic	C1608 SL 1H 060D- T-A
C17	4030006640	Ceramic	C1608 SL 1H 180J- T-A
C18	4030006850	Ceramic	C1608 JB 1H 471K- T-A
EP1	0910025313	P.C. Board	B 2421C (LO)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

## [FIL A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002640	Transistor	2SC3583 R34-T2B
Q2	1530002620	Transistor	2SC3585 R44-T2B
Q3	1530002560	Transistor	2SC4403-3-TR
D1	1790000450	Diode	MA862 (TX)
D3	1790000450	Diode	MA862 (TX)
D5	1790000450	Diode	MA862 (TX)
D7	1790000620	Diode	MA77 (TW)
D8	1790000620	Diode	MA77 (TW)
D9	1790000450	Diode	MA862 (TX)
D10	1790000450	Diode	MA862 (TX)
L1	6200000090	Coil	LQN 2A 18NM
L2	6200000090	Coil	LQN 2A 18NM
L3	6200000090	Coil	LQN 2A 18NM
L4	6200000100	Coil	LQN 2A 22NM
L5	6200000110	Coil	LQN 2A 33NM
L6	6200000110	Coil	LQN 2A 33NM
L7	6200000110	Coil	LQN 2A 33NM
L8	6200000110	Coil	LQN 2A 33NM
L9	6200000110	Coil	LQN 2A 33NM
L11	6200000990	Coil	LQH 3N 5R6M
L12	6200001000	Coil	LQH 3N 6R8M
L13	6200000110	Coil	LQN 2A 33NM
R1	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R2	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R3	7030003620	Resistor	ERJ3GEYJ 333 V (33 kΩ)
R4	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R5	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R6	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R7	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R8	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R9	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R10	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R11	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R12	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003650	Resistor	ERJ3GEYJ 563 V (56 kΩ)
R14	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R15	7030003290	Resistor	ERJ3GEYJ 560 V (56 Ω)
R16	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
C1	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C2	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C3	4030006510	Ceramic	C1608 SL 1H 0R5C- T-A
C4	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C5	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C7	4030006590	Ceramic	C1608 SL 1H 080D- T-A
C8	4030006510	Ceramic	C1608 SL 1H 0R5C- T-A
C9	4030006580	Ceramic	C1608 SL 1H 070D- T-A
C10	4030006630	Ceramic	C1608 SL 1H 150J- T-A
C11	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C12	4030006630	Ceramic	C1608 SL 1H 150J- T-A
C13	4030006640	Ceramic	C1608 SL 1H 180J- T-A
C14	4030006620	Ceramic	C1608 SL 1H 120J- T-A
C15	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C16	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C17	4030006610	Ceramic	C1608 SL 1H 100D- T-A
C18	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C19	4030006630	Ceramic	C1608 SL 1H 150J- T-A
C20	4030006550	Ceramic	C1608 SL 1H 040C- T-A
C21	4030006620	Ceramic	C1608 SL 1H 120J- T-A
C22	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C23	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C24	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C25	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C26	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C27	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C28	4030008620	Ceramic	C1608 JF 1H 153Z- T-A
C29	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C30	4030006870	Ceramic	C1608 JB 1H 222K- T-A

## [FIL A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C31	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C32	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C33	4030006850	Ceramic	C1608 JB 1H 471K- T-A
EP1	0910024953	P.C. Board	B 2417C (FIL A)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

## [FIL B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001970	IC	μPC1676G-T2
Q1	1530002620	Transistor	2SC3585 R44-T2B
Q2	1530002620	Transistor	2SC3585 R44-T2B
Q4	1530002620	Transistor	2SC3585 R44-T2B
D1	1790000450	Diode	MA862 (TX)
D3	1790000450	Diode	MA862 (TX)
D5	1790000620	Diode	MA77 (TW)
D6	1790000620	Diode	MA77 (TW)
D7	1790000620	Diode	MA77 (TW)
D8	1790000620	Diode	MA77 (TW)
L1	6200000720	Coil	LQN 2A 10NM
L2	6200000720	Coil	LQN 2A 10NM
L3	6200000720	Coil	LQN 2A 10NM
L4	6200000720	Coil	LQN 2A 10NM
L5	6200000720	Coil	LQN 2A 10NM
L7	6200000100	Coil	LQN 2A 22NM
L9	6200000720	Coil	LQN 2A 10NM
L10	6200000720	Coil	LQN 2A 10NM
L11	6200000720	Coil	LQN 2A 10NM
R1	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R2	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R3	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R4	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R6	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R7	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R9	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R10	7030003650	Resistor	ERJ3GEYJ 563 V (56 kΩ)
R11	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R12	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
C1	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C2	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C3	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C4	4030006590	Ceramic	C1608 SL 1H 080D- T-A
C5	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C6	4030006540	Ceramic	C1608 SL 1H 030C- T-A
C7	4030006520	Ceramic	C1608 SL 1H 010C- T-A
C8	4030006540	Ceramic	C1608 SL 1H 030C- T-A
C9	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C11	4030006600	Ceramic	C1608 SL 1H 090D- T-A
C12	4030006690	Ceramic	C1608 SL 1H 330J- T-A
C13	4030006560	Ceramic	C1608 SL 1H 050C- T-A
C14	4030006580	Ceramic	C1608 SL 1H 070D- T-A
C15	4030006590	Ceramic	C1608 SL 1H 080D- T-A
C16	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C17	4030006850	Ceramic	C1608 JB 1H 471K- T-A

# **[FIL B UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
C18	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C19	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C20	4030006560	Ceramic	C1608 SL 1H 050C- T-A
C21	4030006620	Ceramic	C1608 SL 1H 120J- T-A
C22	4030006610	Ceramic	C1608 SL 1H 100D- T-A
C23	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C24	4030006570	Ceramic	C1608 SL 1H 060D- T-A
C25	4030006540	Ceramic	C1608 SL 1H 030C- T-A
C26	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C27	4030006850	Ceramic	C1608 JB 1H 471K- T-A
EP1	0910024884	P.C. Board	B 2418D (FIL B)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

# **[DET A UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1120001650	IC	TK10487MT1
IC2	1130004200	IC	TC4S66F (TE85R)
Q1	1530002280	Transistor	2SC4081 T107 S
Q2	1530002020	Transistor	2SC3770-3-TA
Q3	1530002280	Transistor	2SC4081 T107 S
Q5	1590000830	Transistor	FMG2 T149
Q6	1530002280	Transistor	2SC4081 T107 S
Q7	1590001050	Transistor	DTC114TU T107
D1	1790000490	Diode	HSM88AS-TR
X1	6070000060	Discriminator	CDBM455C7
X2	6050006660	Crystal	CR-315
FI1	2020000550	Ceramic Filter	CFUM455E
R1	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R2	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R3	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R5	7310002590	Trimmer	RV-109 (RH03 A3AJ3X0BA) 222
R6	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R7	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R8	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R9	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R10	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R11	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R13	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R14	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R16	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R19	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R20	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R23	7030003270	Resistor	ERJ3GEYJ 390 V (39 Ω)
R25	7030003840	Resistor	ERJ3GEYJ 225 V (2.2 MΩ)
R26	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R27	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R28	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R29	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R31	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R32	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R33	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R34	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R35	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)

# **[DET A UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C2	4030006740	Ceramic	C1608 SL 1H 820J- T-A
C3	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C4	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C5	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C6	4030006730	Ceramic	C1608 SL 1H 680J- T-A
C7	4030006660	Ceramic	C1608 SL 1H 220J- T-A
C8	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C10	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C11	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C12	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C13	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C14	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C15	4030006690	Ceramic	C1608 SL 1H 330J- T-A
C16	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C17	4030005100	Ceramic	C2012 JB 1H 273K- T-A
C19	4030006890	Ceramic	C1608 JF 1H 103Z- T-A
C20	4030006900	Ceramic	C1608 JB 1E 103K- T-A
C21	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C22	4030005110	Ceramic	C2012 JB 1E 473K- T-A
C24	4030005110	Ceramic	C2012 JB 1E 473K- T-A
C25	4030005110	Ceramic	C2012 JB 1E 473K- T-A
C26	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C27	4030006890	Ceramic	C1608 JF 1H 103Z- T-A
C28	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C29	4030006890	Ceramic	C1608 JF 1H 103Z- T-A
C30	4030006890	Ceramic	C1608 JF 1H 103Z- T-A
EP1	0910025152	P.C. Board	B 2415B (DET A)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

# **[DET B UNIT]**

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002080	IC	TA7787AF (TP1)
IC2	1130004200	IC	TC4S66F (TE85R)
IC3	1130004200	IC	TC4S66F (TE85R)
Q2	1530002020	Transistor	2SC3770-3-TA
Q3	1590001060	Transistor	DTA114TU T107
Q4	1530002020	Transistor	2SC3770-3-TA
R3	7030003530	Resistor	ERJ3GEYJ 562 V (5.6 kΩ)
R6	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R7	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R8	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R9	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R10	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R11	7030003310	Resistor	ERJ3GEYJ 820 V (82 Ω)
R12	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R13	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R14	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
C1	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C2	4030006730	Ceramic	C1608 SL 1H 680J- T-A
C3	4550002890	Tantalum	TESVA 1A 225M1-8L
C5	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C6	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C7	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C8	4030006900	Ceramic	C1608 JB 1E 103K- T-A
C9	4550002950	Tantalum	TESVA 0J 335M1-8L

# [DET B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
EP1	0910025143	P.C. Board B 2416C (DET B)
EP2	6910003110	Lead Frame HFB2.0-0.7-8 (N)

# [IO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
IC1	1130000830	IC $\mu$ PD4094BG-T1
IC2	1130000830	IC $\mu$ PD4094BG-T1
Q4	1590001060	Transistor DTA114TU T107
Q5	1590001060	Transistor DTA114TU T107
Q6	1590001060	Transistor DTA114TU T107
Q7	1590001060	Transistor DTA114TU T107
R1	7310002580	Trimmer RV-108 (RH03 A3A15X05A) 104
R2	7030003560	Resistor ERJ3GEYJ 103 V (10 k $\Omega$ )
R3	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R4	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R5	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R6	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R7	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R8	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
R9	7030003940	Resistor ERJ3GEYF 104 V (100 k $\Omega$ )
R10	7030003940	Resistor ERJ3GEYF 104 V (100 k $\Omega$ )
R11	7030003940	Resistor ERJ3GEYF 104 V (100 k $\Omega$ )
R12	7030003950	Resistor ERJ3GEYF 204 V (200 k $\Omega$ )
EP1	0910024963	P.C. Board B 2419C (IO A)
EP2	0910024972	P.C. Board B 2420B (IO B)
EP3	6910003110	Lead Frame HFB2.0-0.7-8 (N)
EP4	6510008580	Lead Frame PT2.0-0.7-16.5 (K)

# [PLL VCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
IC1	1140001280	IC MB1501PF-G-BND
IC2	1110001970	IC $\mu$ PC1676G-T2
Q1	1530000371	Transistor 2SC3356 R25-T2B
Q2	1530000371	Transistor 2SC3356 R25-T2B
Q3	1530002560	Transistor 2SC4403-3-TR
Q4	1530002560	Transistor 2SC4403-3-TR
Q7	1590000650	Transistor DTA144TU T107
Q8	1590001050	Transistor DTC114TU T107
D1	1790000531	Varicap MA333 (TW) .AB
D2	1790000531	Varicap MA333 (TW) .AB
D3	1790000531	Varicap MA333 (TW) .AB
D4	1790000531	Varicap MA333 (TW) .AB
X1	6050005790	Crystal CR-257

# [PLL VCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
L1	6110002010	Coil LA-224
L2	6110001980	Coil LA-222
L3	6200001140	Coil MLF2012D R18M-T
L5	6200000130	Coil LQN 2A 47NM
R2	7030003520	Resistor ERJ3GEYJ 472 V (4.7 k $\Omega$ )
R3	7030003480	Resistor ERJ3GEYJ 222 V (2.2 k $\Omega$ )
R4	7030003400	Resistor ERJ3GEYJ 471 V (470 $\Omega$ )
R5	7030003320	Resistor ERJ3GEYJ 101 V (100 $\Omega$ )
R6	7030003760	Resistor ERJ3GEYJ 474 V (470 k $\Omega$ )
R7	7030003760	Resistor ERJ3GEYJ 474 V (470 k $\Omega$ )
R8	7030003320	Resistor ERJ3GEYJ 101 V (100 $\Omega$ )
R9	7030003440	Resistor ERJ3GEYJ 102 V (1 k $\Omega$ )
R10	7030003680	Resistor ERJ3GEYJ 104 V (100 k $\Omega$ )
R11	7030003630	Resistor ERJ3GEYJ 393 V (39 k $\Omega$ )
R12	7030003390	Resistor ERJ3GEYJ 391 V (390 $\Omega$ )
R13	7030003660	Resistor ERJ3GEYJ 683 V (68 k $\Omega$ )
R14	7030003420	Resistor ERJ3GEYJ 481 V (680 $\Omega$ )
R16	7030003320	Resistor ERJ3GEYJ 101 V (100 $\Omega$ )
R19	7030003450	Resistor ERJ3GEYJ 122 V (1.2 k $\Omega$ )
R20	7030003450	Resistor ERJ3GEYJ 122 V (1.2 k $\Omega$ )
R23	7030003480	Resistor ERJ3GEYJ 222 V (2.2 k $\Omega$ )
R24	7030003400	Resistor ERJ3GEYJ 471 V (470 $\Omega$ )
R25	7030003540	Resistor ERJ3GEYJ 682 V (6.8 k $\Omega$ )
R26	7030003570	Resistor ERJ3GEYJ 123 V (12 k $\Omega$ )
C1	4030006900	Ceramic C1608 JB 1E 103K- T-A
C2	4030006900	Ceramic C1608 JB 1E 103K- T-A
C3	4030006600	Ceramic C1608 SL 1H 090D- T-A
C4	4030006850	Ceramic C1608 JB 1H 471K- T-A
C5	4030006860	Ceramic C1608 JB 1H 102K- T-A
C6	4030006660	Ceramic C1608 SL 1H 220J- T-A
C7	4030006610	Ceramic C1608 SL 1H 100D- T-A
C8	4030006510	Ceramic C1608 SL 1H 0R5C- T-A
C10	4030006850	Ceramic C1608 JB 1H 471K- T-A
C11	4030006610	Ceramic C1608 SL 1H 100D- T-A
C12	4030006580	Ceramic C1608 SL 1H 070D- T-A
C13	4030006850	Ceramic C1608 JB 1H 471K- T-A
C16	4030008630	Ceramic C1608 JF 1C 104Z- T-A
C17	4030006850	Ceramic C1608 JB 1H 471K- T-A
C18	4030006560	Ceramic C1608 SL 1H 050C- T-A
C19	4030006660	Ceramic C1608 SL 1H 220J- T-A
C20	4030006860	Ceramic C1608 JB 1H 102K- T-A
C21	4030006510	Ceramic C1608 SL 1H 0R5C- T-A
C22	4030007030	Ceramic C1608 CH 1H 150J- T-A
C23	4610001260	Trimmer ECRJA020E12W
C24	4030007080	Ceramic C1608 CH 1H 390J- T-A
C25	4030006850	Ceramic C1608 JB 1H 471K- T-A
C26	4030008630	Ceramic C1608 JF 1C 104Z- T-A
C28	4030006850	Ceramic C1608 JB 1H 471K- T-A
C29	4030008630	Ceramic C1608 JF 1C 104Z- T-A
C30	4550000460	Tantalum TESVA 1C 105M1-8L
C31	4030006600	Ceramic C1608 SL 1H 090D- T-A
C32	4550002950	Tantalum TESVA 0J 335M1-8L
C33	4550002950	Tantalum TESVA 0J 335M1-8L
EP1	0910024895	P.C. Board B 2422E (PLL VCO)

# [REG UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
IC1	1180000530	IC S-81250HG-RD-T1
IC2	1130004170	IC TC4S01F (TE85R)



# [REG UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002280	Transistor	2SC4081 T107 S
Q2	1520000200	Transistor	2SB798-T2 DK
Q3	1530002280	Transistor	2SC4081 T107 S
Q4	1520000200	Transistor	2SB798-T2 DK
D1	1750000160	Diode	DA114 T107
D2	1750000160	Diode	DA114 T107
R1	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R2	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R4	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R5	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
C1	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C2	4510003160	Electrolytic	16 RC2 22 μF (D=4.0)
C3	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C4	4510001320	Electrolytic	6R3 MS5 47 μF
C5	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C6	4510003190	Electrolytic	6.3 RC2 47 μF (D=4.0)
C7	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C8	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C11	4510003190	Electrolytic	6.3 RC2 47 μF (D=4.0)
EP1	0910025123	P.C. Board	B 2439C (REG)
EP2	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

# [BPF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	6910005740	IC	CB424M1R
Q1	1530002030	Transistor	2SC3772-3-TA
Q3	1530002620	Transistor	2SC3585 R44-T2B
L1	6200000100	Coil	LQN 2A 22NM
L2	6200000130	Coil	LQN 2A 47NM
L5	6200000110	Coil	LQN 2A 33NM
R1	7030003620	Resistor	ERJ3GEYJ 333 V (33 kΩ)
R2	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R3	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R6	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R7	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R9	7030003390	Resistor	ERJ3GEYJ 391 V (390 Ω)
R10	7030003580	Resistor	ERJ3GEYJ 153 V (15 kΩ)
C1	4030006690	Ceramic	C1608 SL 1H 330J- T-A
C2	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C3	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C4	4610001170	Trimmer	ECRJA006A12W
C5	4030006530	Ceramic	C1608 SL 1H 020C- T-A
C6	4030006510	Ceramic	C1608 SL 1H 0R5C- T-A
C7	4610001270	Trimmer	ECRJA010A12W
C8	4030006520	Ceramic	C1608 SL 1H 010C- T-A
C9	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C11	4030006830	Ceramic	C1608 JF 1C 104Z- T-A

# [BPF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C12	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C15	4030006850	Ceramic	C1608 JB 1H 471K- T-A
C16	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
C17	4550003000	Tantalum	TEMSVB 0G 226M-12 L
C19	4030008630	Ceramic	C1608 JF 1C 104Z- T-A
EP1	0910024944	P.C. Board	B 2414D (BPF)
EP2	0910025053	P.C. Board	B 2440C (BPF. T)
EP3	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

# [PRT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1520000200	Transistor	2SB798-T2 DK
Q2	1530002280	Transistor	2SC4081 T107 S
D1	1790000680	Diode	SB20-03P-TD
D2	1790000670	Diode	SB07-03C-TA
D5	1790000590	Diode	MA110(TW)
D6	1730002160	Zener	02CZ5.1-Z (TE85R)
D7	1790000590	Diode	MA110(TW)
D8	1790000670	Diode	SB07-03C-TA
D9	1790000680	Diode	SB20-03P-TD
R1	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R2	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R3	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R4	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R5	7030003470	Resistor	ERJ3GEYJ 182 V (1.8 kΩ)
R6	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R7	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R8	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R9	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R10	7030003230	Resistor	ERJ3GEYJ 180 V (18 Ω)
C1	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C2	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C3	4030006710	Ceramic	C1608 SL 1H 470J- T-A
C4	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C5	4030006860	Ceramic	C1608 JB 1H 102K- T-A
C6	4030006860	Ceramic	C1608 JB 1H 102K- T-A
EP1	0910023862	P.C. Board	B 2278B (PRT)

Downloaded by  
RadioAmateur.EU



## SECTION 7 ADJUSTMENT PROCEDURES

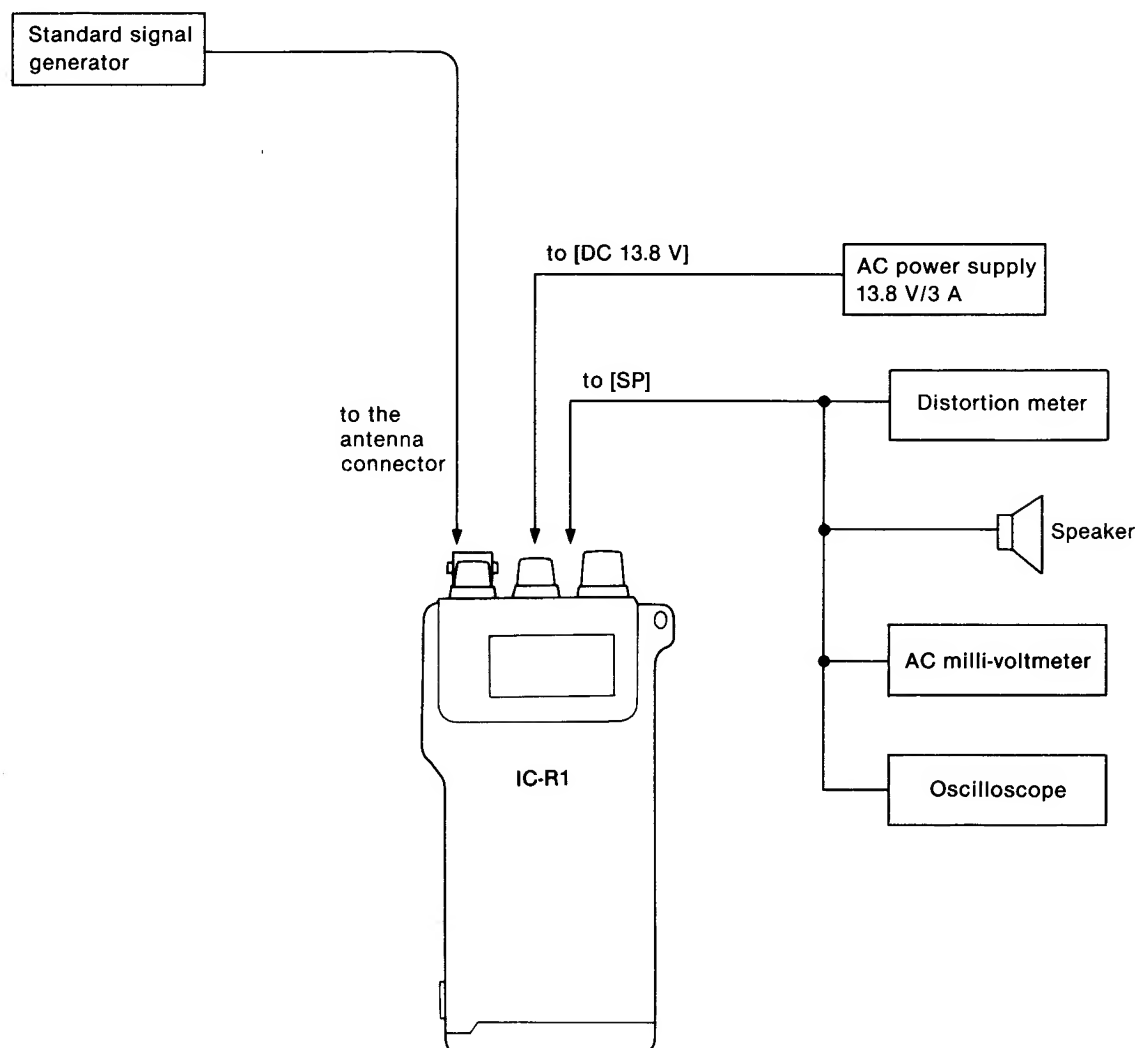
### 7-1 PREPARATION BEFORE SERVICING

#### ■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
AC power supply	Output voltage : 13.8 V DC Current capacity : 1 A or more	External speaker	Impedance : 8 $\Omega$
Frequency counter	Frequency range : 0.1 MHz~400 MHz Frequency accuracy : $\pm 1$ ppm or better Sensitivity : 100 mV or better	Distortion meter	Frequency range : 1 kHz $\pm$ 10 Hz Measuring range : 1~10 %
Oscilloscope	Frequency range : DC~50 MHz Measuring range : 0.01~10 V	Standard signal generator (SSG)	Frequency range : 0.1 MHz~1 GHz Output level : -127~-17 dBm (0.1 $\mu$ V~32 mV)
AC milli-voltmeter	Measuring range : 10 mV~10 V		

CW: Clockwise  
CCW: Counterclockwise

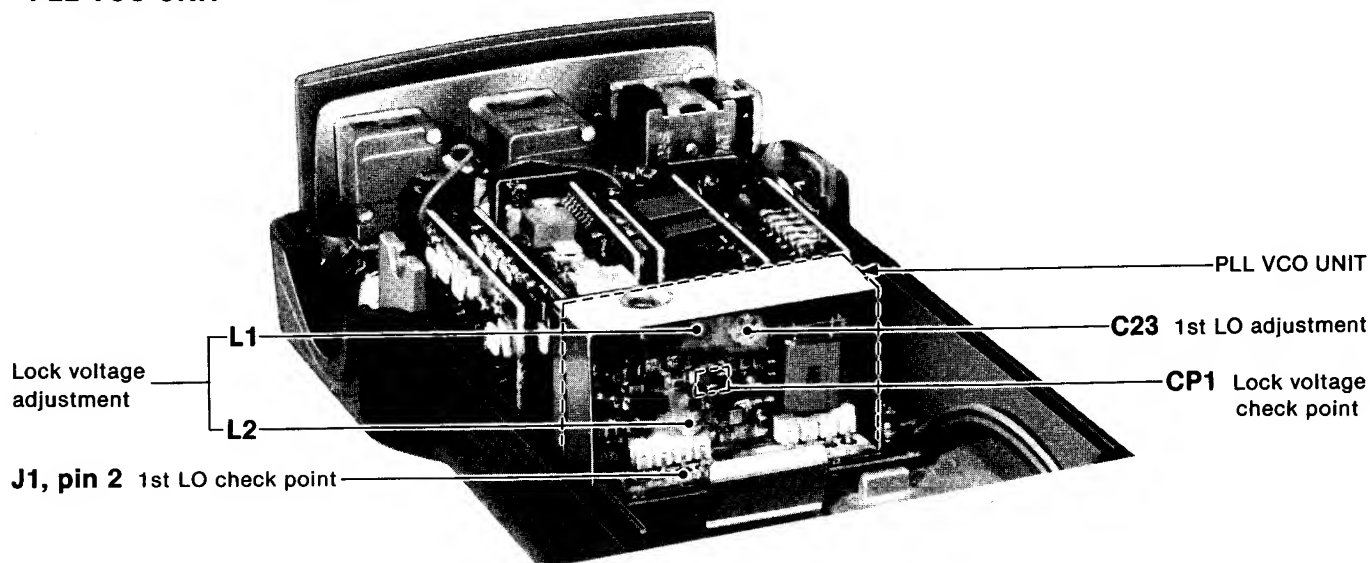
#### ■ CONNECTION



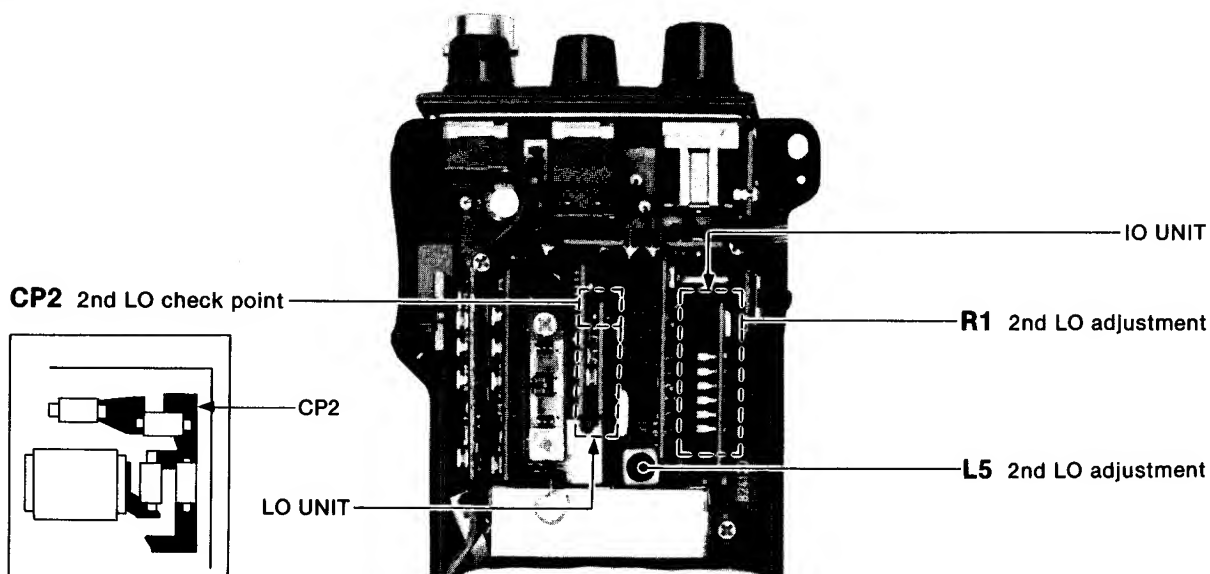
## 7-2 PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	• Displayed frequency: 0.100 MHz • Mode : FM	PLL VCO	Connect the oscilloscope to the CP1.	0.9 V DC	PLL VCO	L1
	2	• Displayed frequency: 125.000 MHz • Mode : FM			1.0 V DC		L2
1st LO	1	• Displayed frequency: 100.000 MHz • Mode : FM	PLL VCO	Connect the Frequency counter to J1, pin 2.	366.700 MHz	PLL VCO	C23
2nd LO	1	• Displayed frequency: 1200.000 MHz • Mode : FM	LO	Connect the Frequency counter to the CP2.	256.000 MHz	MAIN	L5
	2	• Displayed frequency: 1199.9995 MHz • Mode : FM			256.0095 MHz	IO	R1
	3	• Displayed frequency: 1200.00 MHz • Mode : FM			256.000 MHz	MAIN	L5


### • PLL VCO UNIT



### • MAIN UNIT

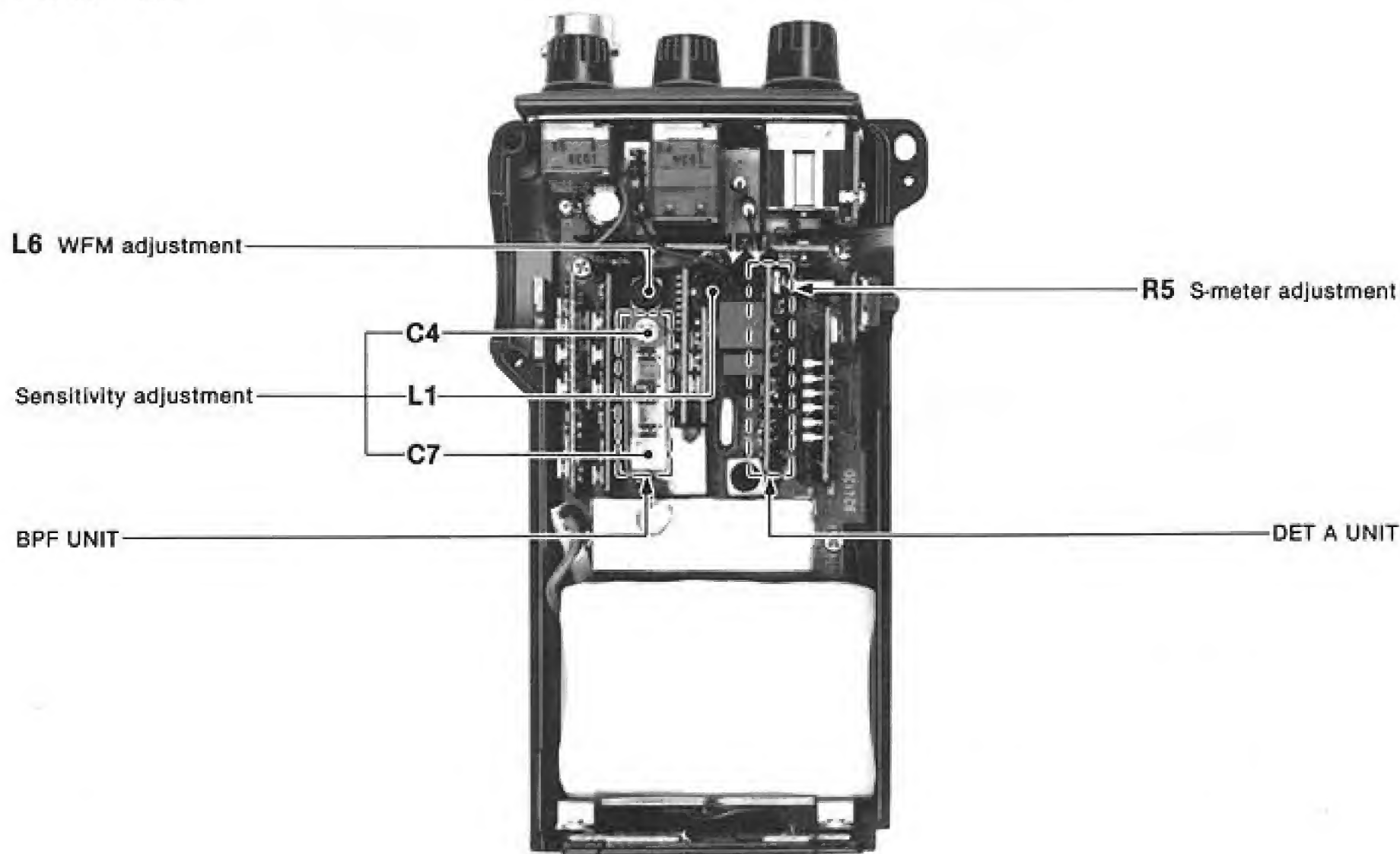


## 7-3 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	<ul style="list-style-type: none"> <li>Displayed frequency: 280.000 MHz</li> <li>[SQL] control : Max. CCW</li> <li>Set the signal generator;                             <ul style="list-style-type: none"> <li>Level : <math>0.32 \mu\text{V}^*</math> (<math>-117 \text{ dBm}</math>)</li> <li>Modulation: 1 kHz</li> <li>Deviation : <math>\pm 3.5 \text{ kHz}</math></li> </ul> </li> <li>Mode : FM</li> </ul>	Top panel	Connect the AC millivoltmeter and distortion meter to the [SP] jack.	Less than $0 \text{ dB}\mu$ ( $12 \text{ dB SINAD}$ )	BPF	C4, C7
S-METER	1	<ul style="list-style-type: none"> <li>Displayed frequency: 500.000 MHz</li> <li>Set the signal generator;                             <ul style="list-style-type: none"> <li>Level : <math>0.32 \mu\text{V}^*</math> (<math>-117 \text{ dBm}</math>)</li> <li>Modulation: 1 kHz</li> <li>Deviation : <math>\pm 3.5 \text{ kHz}</math></li> </ul> </li> <li>Mode : FM</li> </ul>	Function display	S-indicator	S9 	DET A	R5
WFM	1	<ul style="list-style-type: none"> <li>Displayed frequency: 82.500 MHz</li> <li>[SQL] control : Max. CCW</li> <li>Set the signal generator;                             <ul style="list-style-type: none"> <li>Level : <math>1 \text{ mV}^*</math> (<math>-47 \text{ dB}\mu</math>)</li> <li>Modulation: 1 kHz</li> <li>Deviation : <math>50 \text{ kHz}</math></li> </ul> </li> <li>Mode : WFM</li> </ul>	Top panel	Connect the oscilloscope and distortion meter to the [SP] jack.	Adjust for sine waveform on the oscilloscope.	MAIN	L6
	2	<ul style="list-style-type: none"> <li>Adjust SSG's output level so that SINAD level becomes 12 dB.</li> </ul>			Minimum level		L6

\* This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

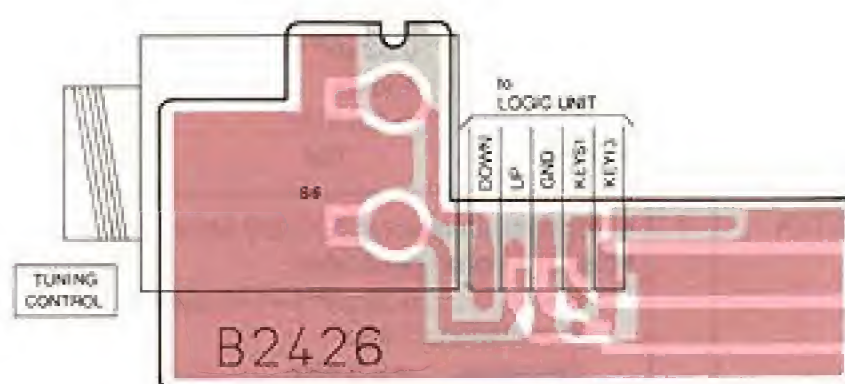
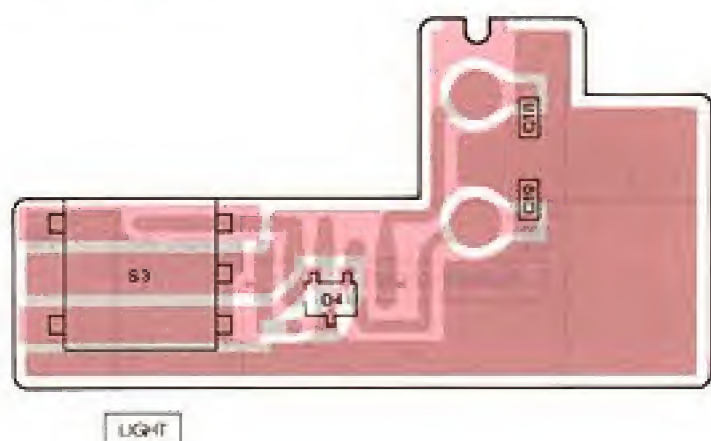
### • MAIN UNIT



## SECTION 8 BOARD LAYOUTS

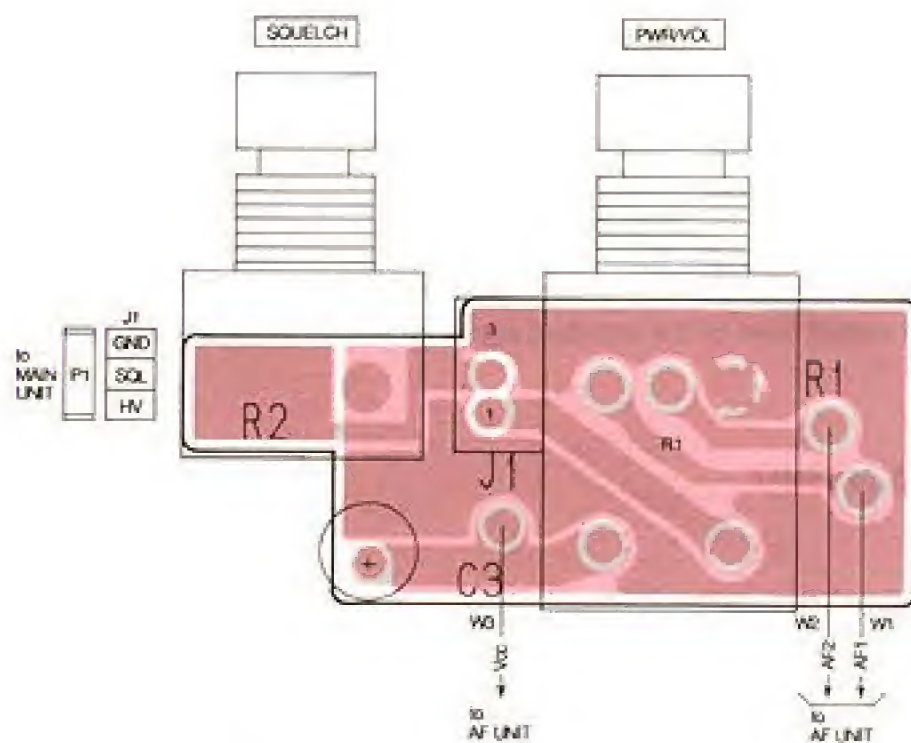
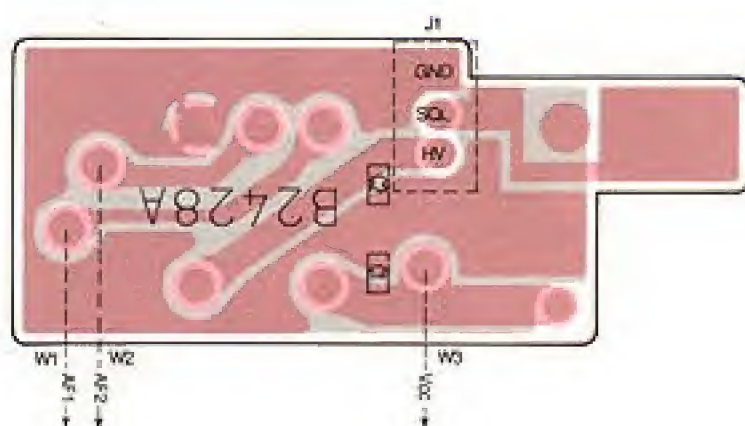
### 8-1 SUBORDINATE LOGIC UNITS

#### • ENC BOARD

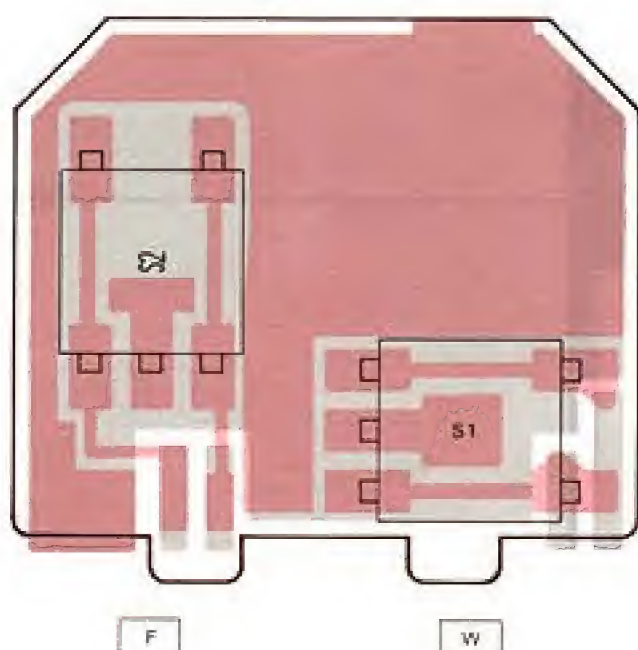


#### • VR UNIT

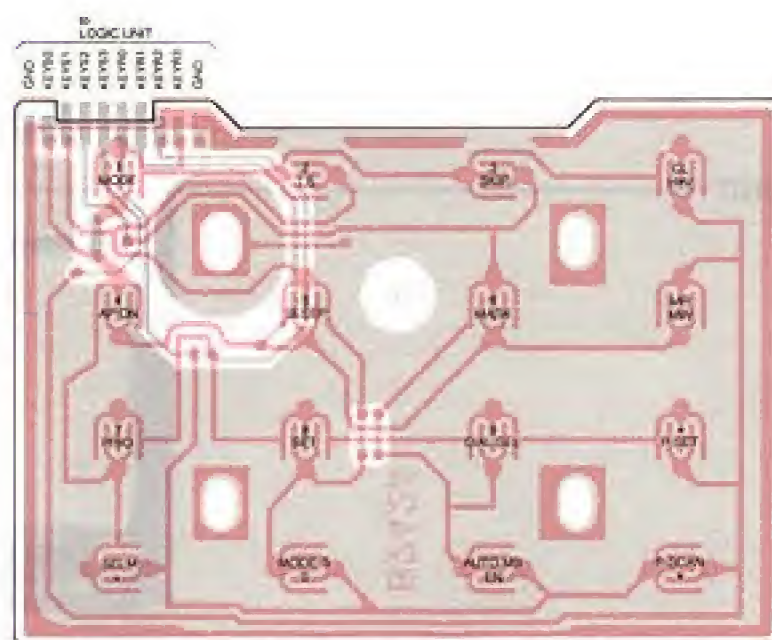
Downloaded by  
RadioAmateur.EU



#### • FUNC BOARD



#### • LOGIC C BOARD

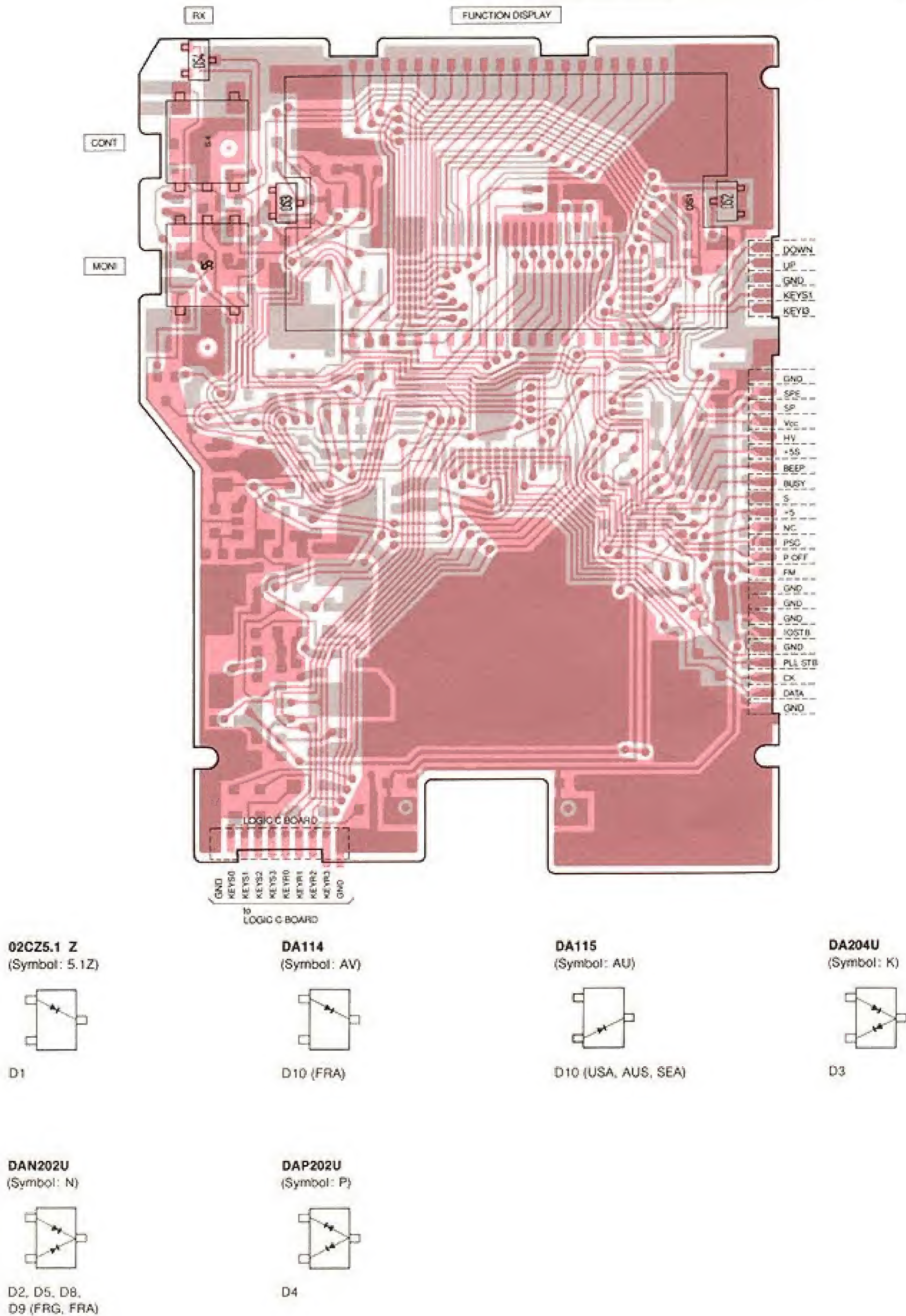




8-2 LOGIC UNIT

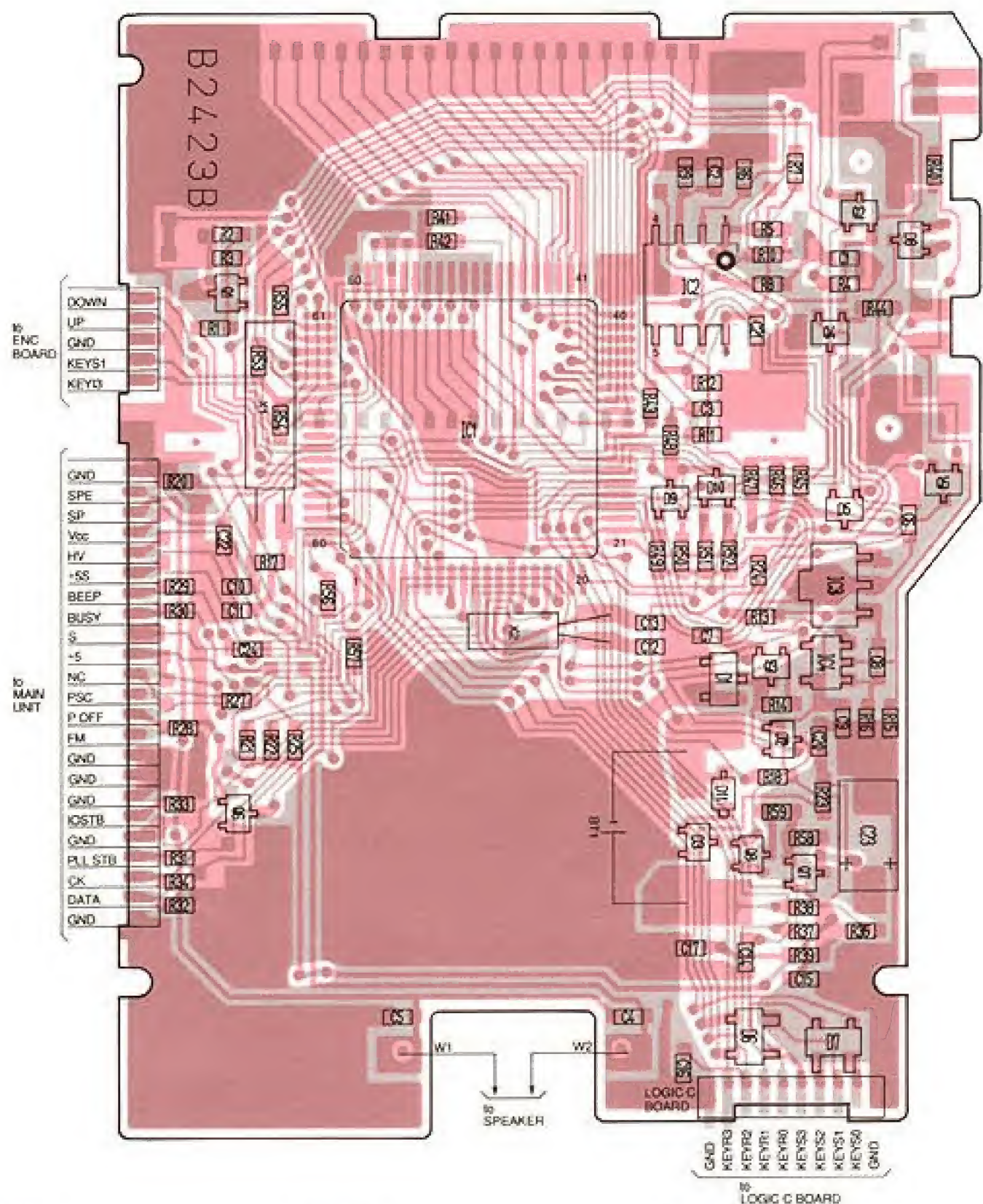
• LOGIC UNIT (TOP VIEW)

The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

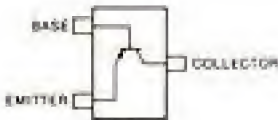




• LOGIC UNIT (BOTTOM VIEW)

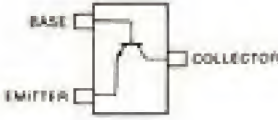


**2SA1588 GR**  
(Symbol: ZG)



Q7

**2SC4081 R**  
(Symbol: BR)



Q1, Q4

**2SK880 Y**  
(Symbol: XY)



Q3

**DTA144EU**  
(Symbol: 16)



Q2

**DTC144EU**  
(Symbol: 26)



Q5, Q8

**DTC144TU**  
(Symbol: 06)



Q6

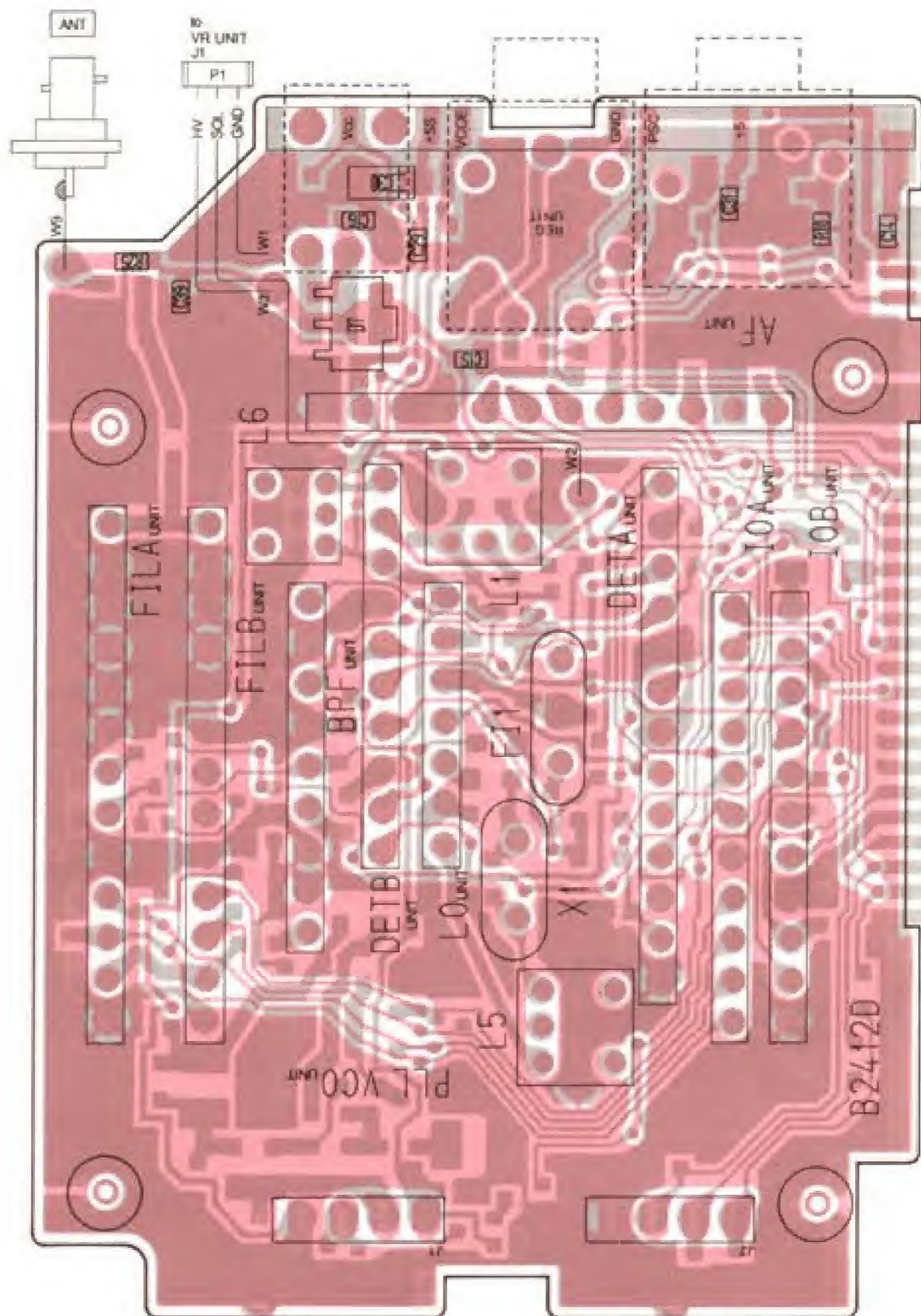
Downloaded by  
RadioAmateur.EU



## 8-3 MAIN UNIT

### • MAIN UNIT (TOP VIEW)

The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.



**DA204U**  
(Symbol: K)



D12

**DAN202U**  
(Symbol: N)



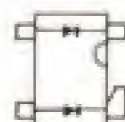
D11

**HSM88AS**  
(Symbol: C1)



D3

**MA862**  
(Symbol: M11)



D4, D6, D8, D14, D15

**SB20-03P**  
(Symbol: SC)

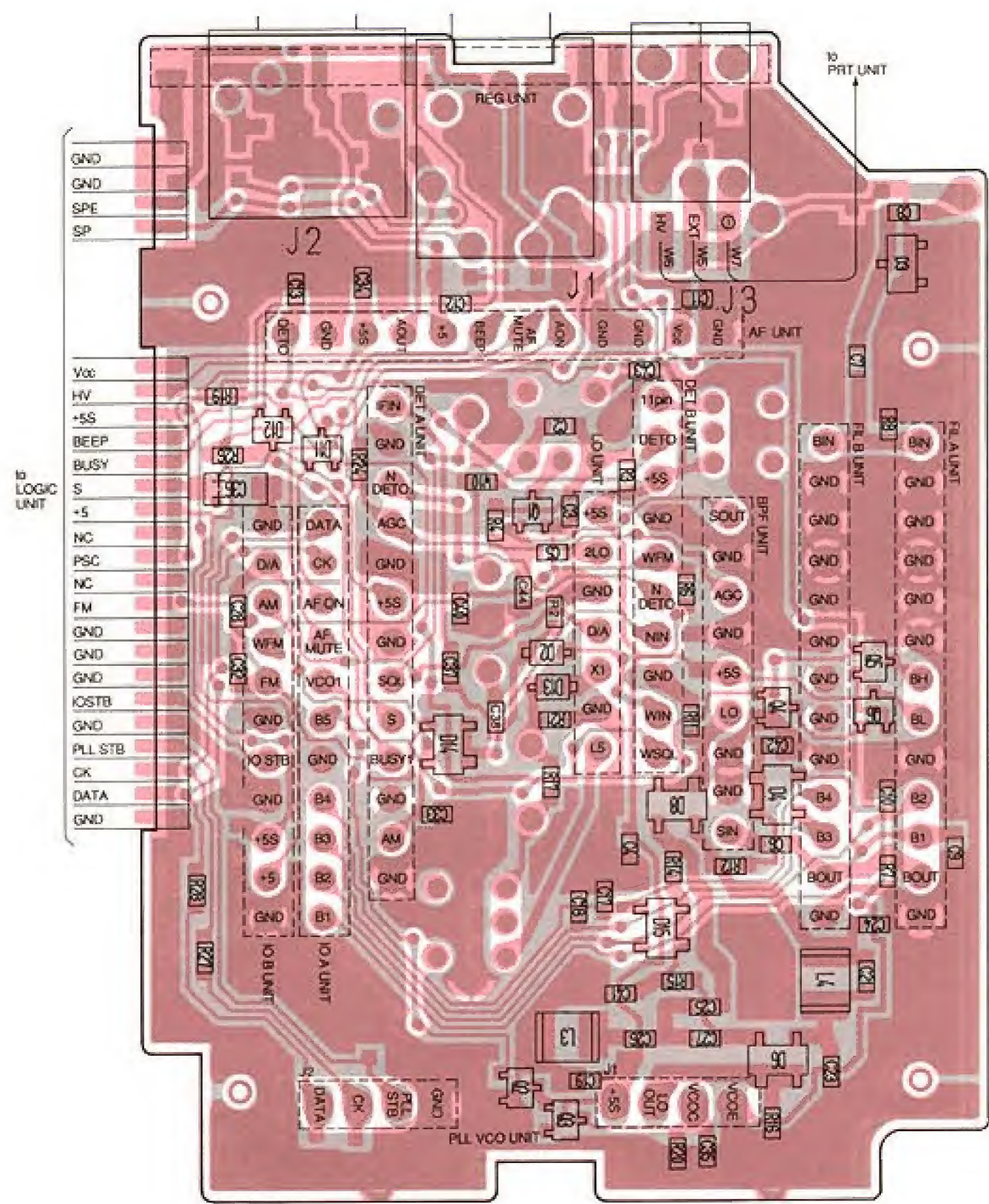


D7



• MAIN UNIT (BOTTOM VIEW)

Downloaded by  
RadioAmateur.EU

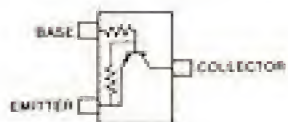


**2SC4403 3**  
(Symbol: LY3)



Q1

**DTA143ZU**  
(Symbol: 113)



Q3

**DTA144EU**  
(Symbol: 16)



Q5, Q6

**DTC144EU**  
(Symbol: 26)

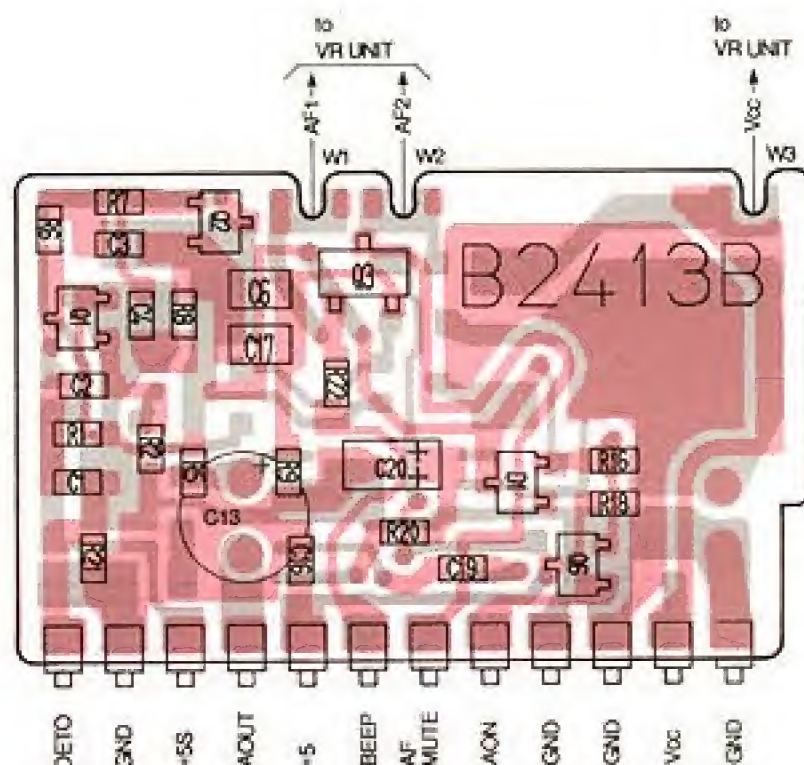
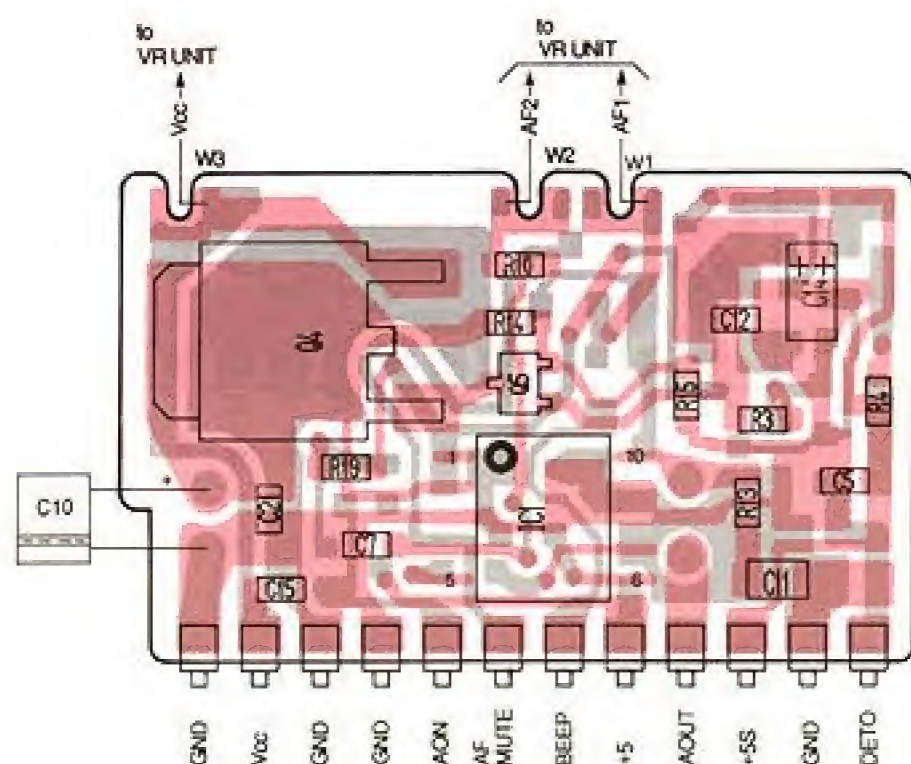


Q2, Q4



## 8-4 SUBORDINATE MAIN UNITS

### • AF UNIT



**DAP202U**  
(Symbol: P)



D1

**2SB1182 Q**  
(Symbol: B1182)



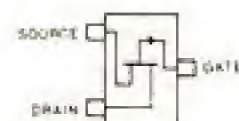
Q4

**2SC4081 R**  
(Symbol: BR)



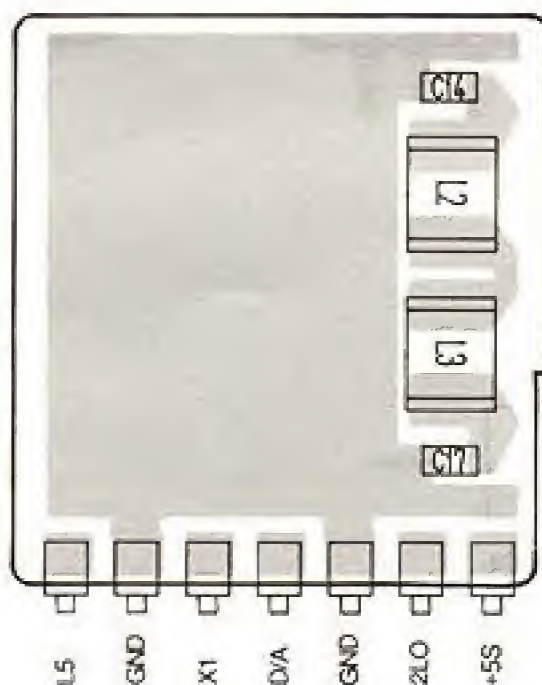
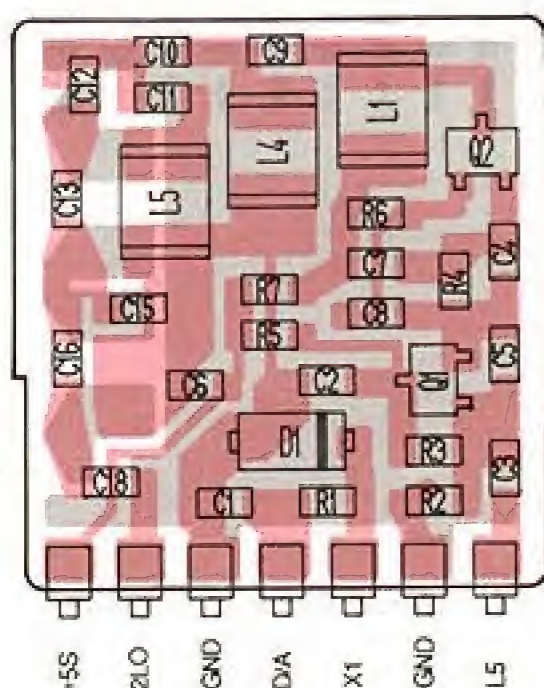
Q1, Q2, Q5, Q6

**2SJ106 GR**  
(Symbol: VG)



Q3

### • LO UNIT



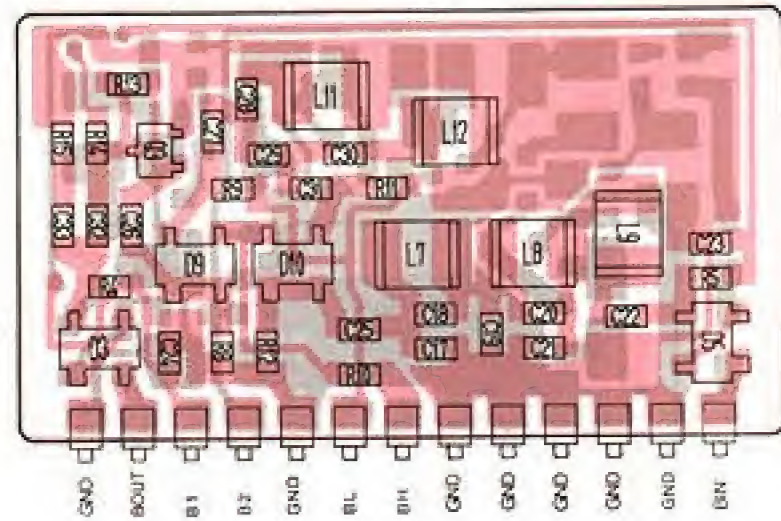
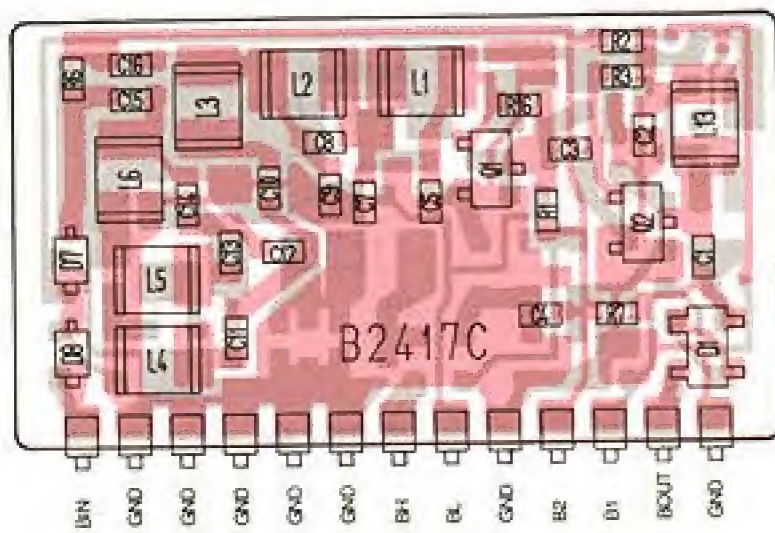
**2SC4403 3**  
(Symbol: LY3)



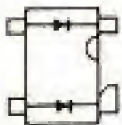
Q1, Q2



- **FIL A UNIT**

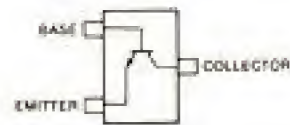


**MA862**  
(Symbol: M11)



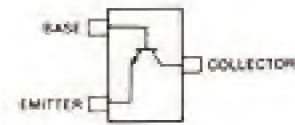
D1, D3, D5, D9, D10

**2SC3583**  
(Symbol: R34)  
**2SC3585**  
(Symbol: R44)



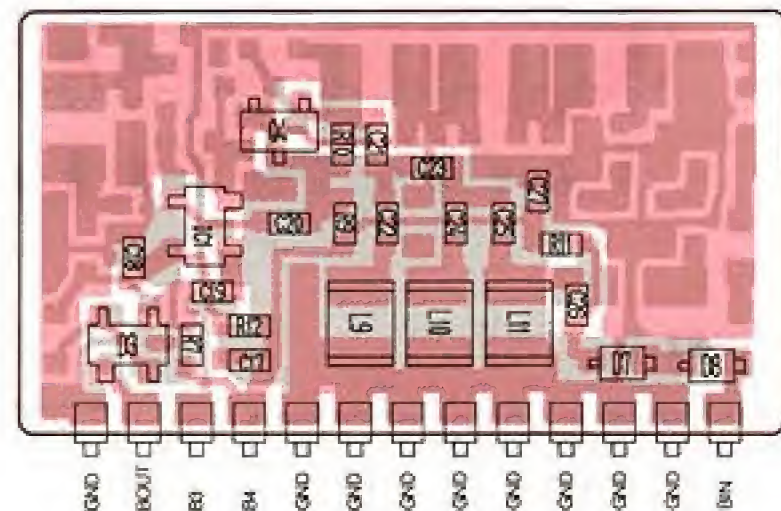
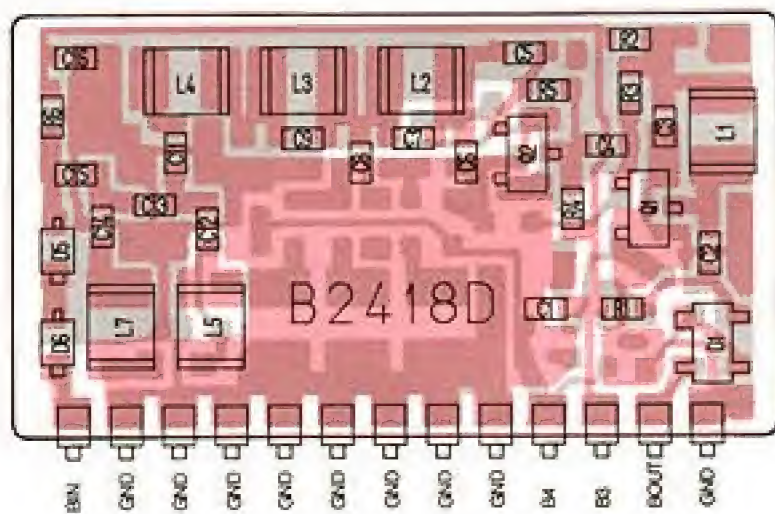
2SC3583: Q1  
2SC3585: Q2

**2SC4403 3**  
(Symbol: LY3)



03

- **FIL B UNIT**



**MA862**  
(Symbol: M11)



D1, D3

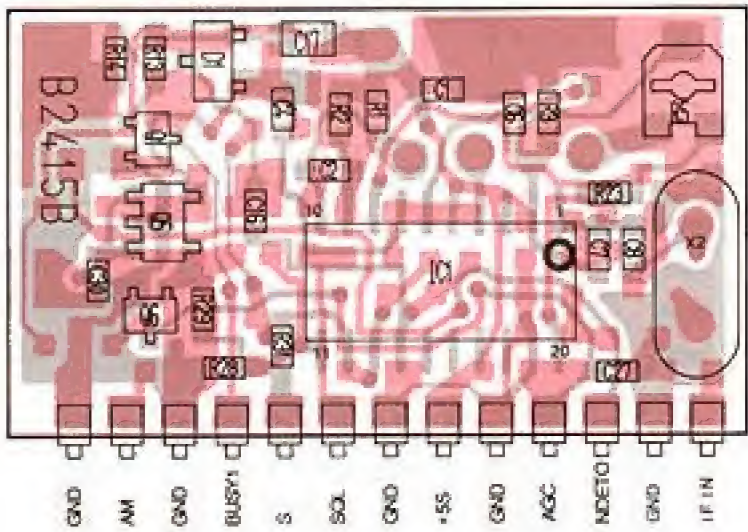
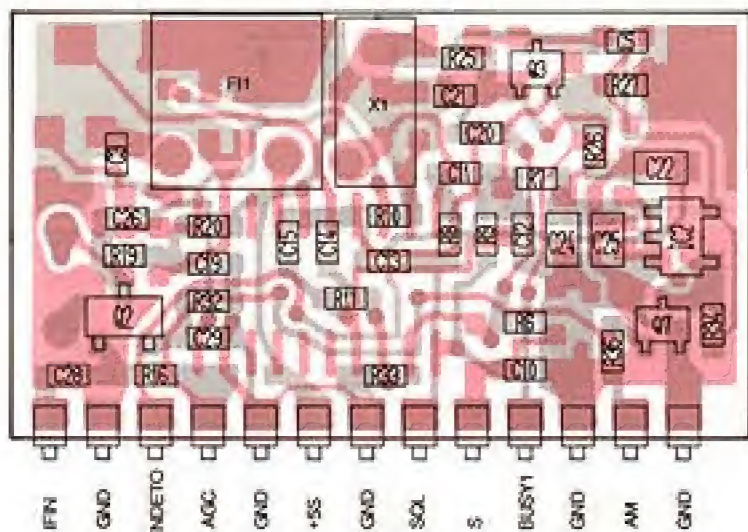
2SC3585  
{Symbol: R44}



Q1, Q2, Q4



• DET A UNIT

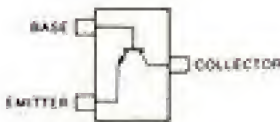


**HSM88AS**  
(Symbol: C1)



D1

**2SC3770 3**  
(Symbol: JY3)



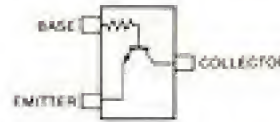
Q2

**2SC4081 S**  
(Symbol: BS)



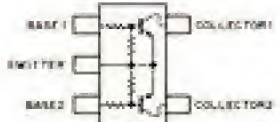
Q1, Q3, Q6

**DTC114TU T107**  
(Symbol: 04)



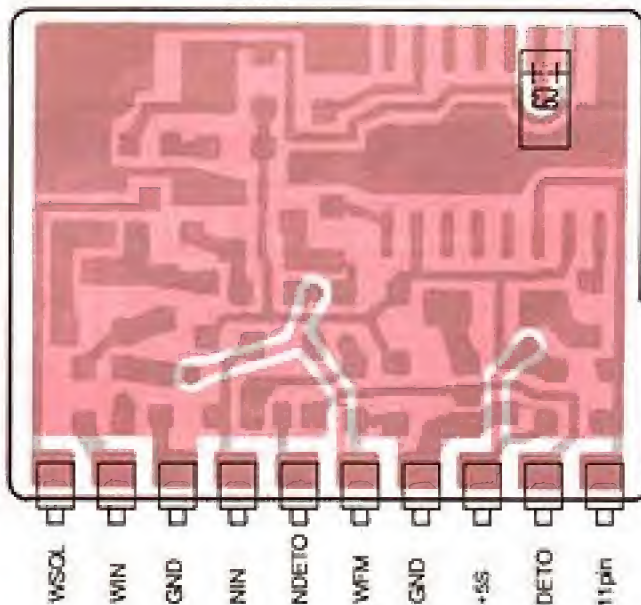
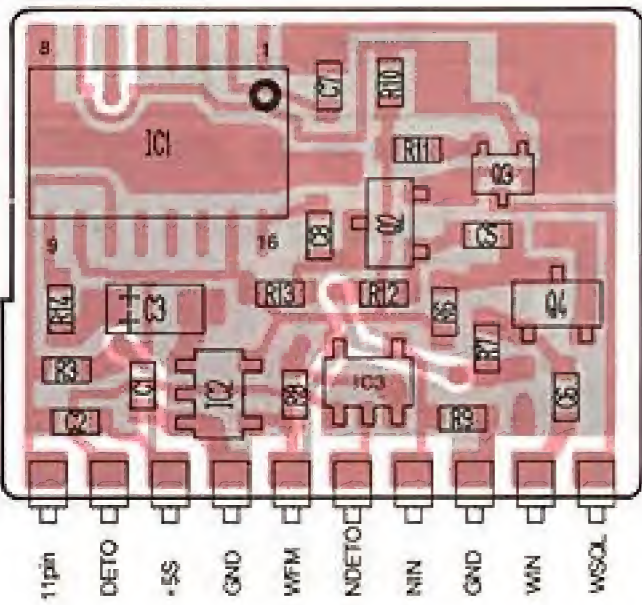
Q7

**FMG2**  
(Symbol: G2)



Q5

• DET B UNIT

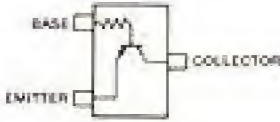


**2SC3770 3**  
(Symbol: JY3)



Q2, Q4

**DTA114TU T107**  
(Symbol: 94)

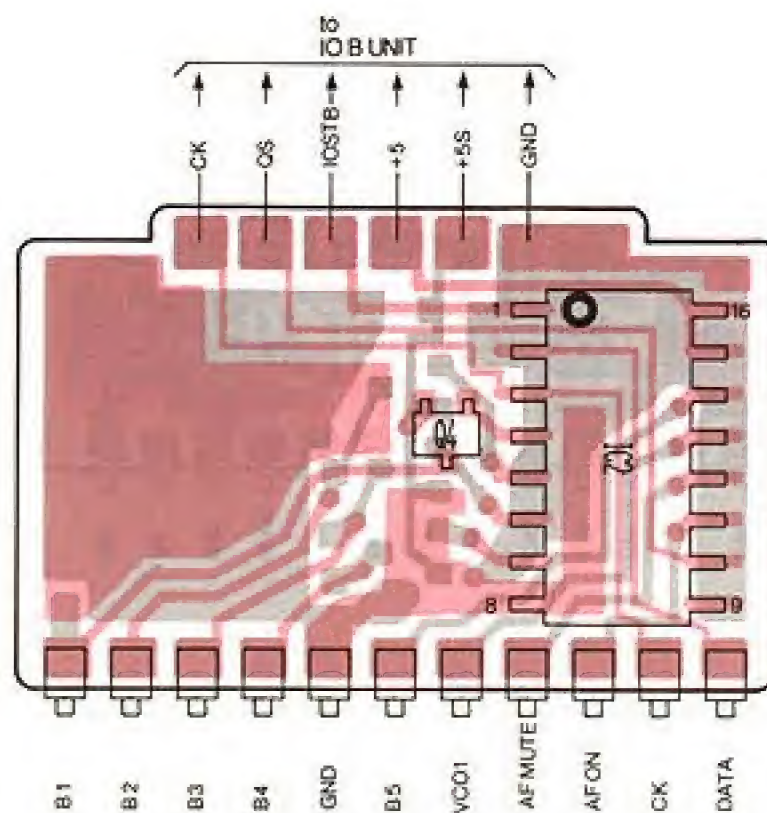
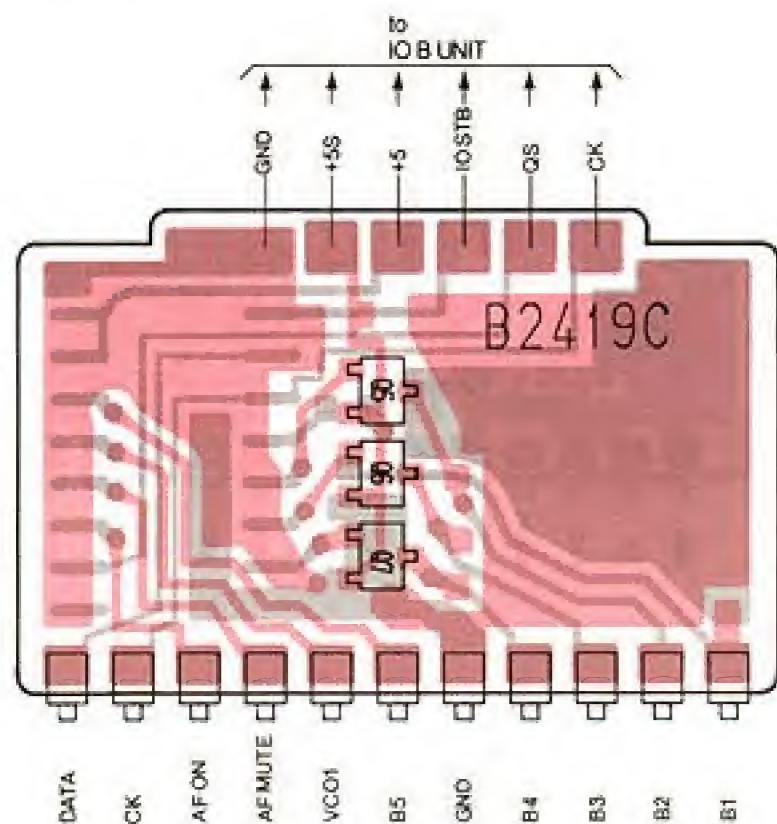


Q3

Downloaded by  
RadioAmateur.EU



## • IO A UNIT

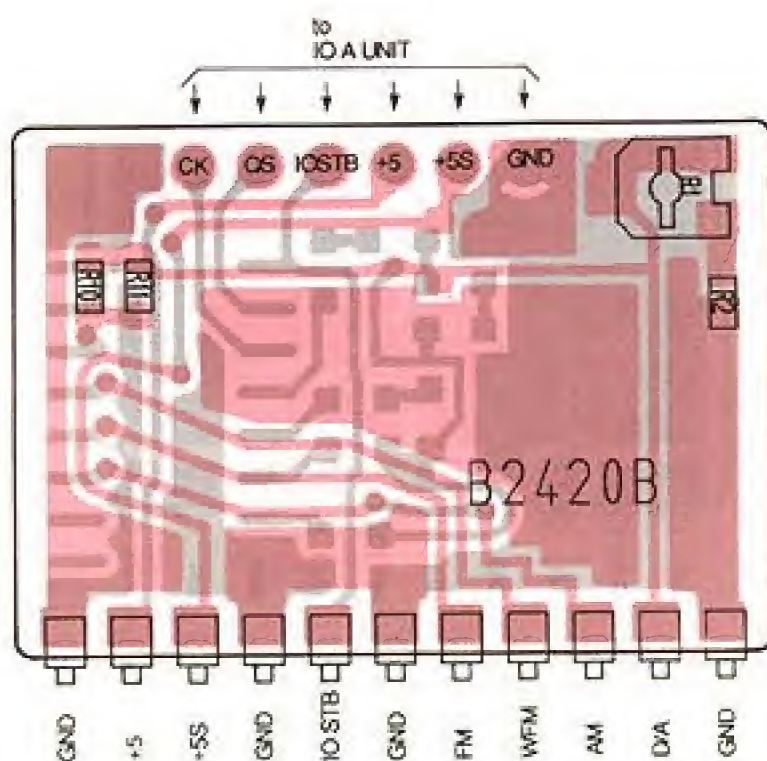
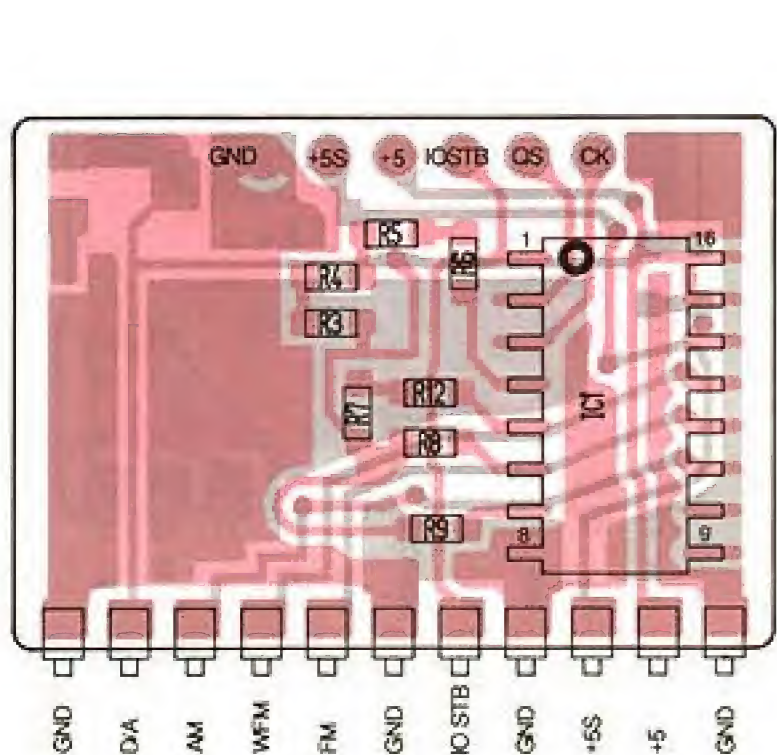


DTA114TU T107  
(Symbol: 94)



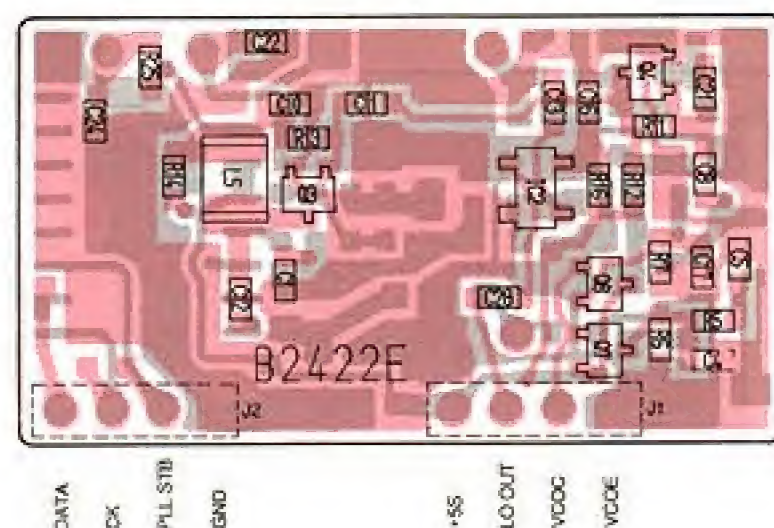
Q4, Q5, Q6, Q7

## • IO B UNIT

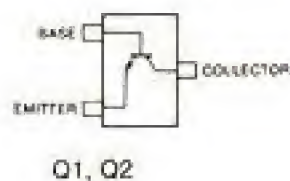




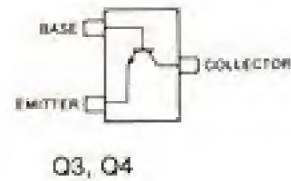
• PLL VCO UNIT



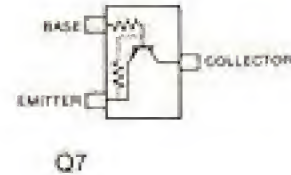
**2SC3356 R25**  
(Symbol: R25)



**2SC4403 3**  
(Symbol: LY3)



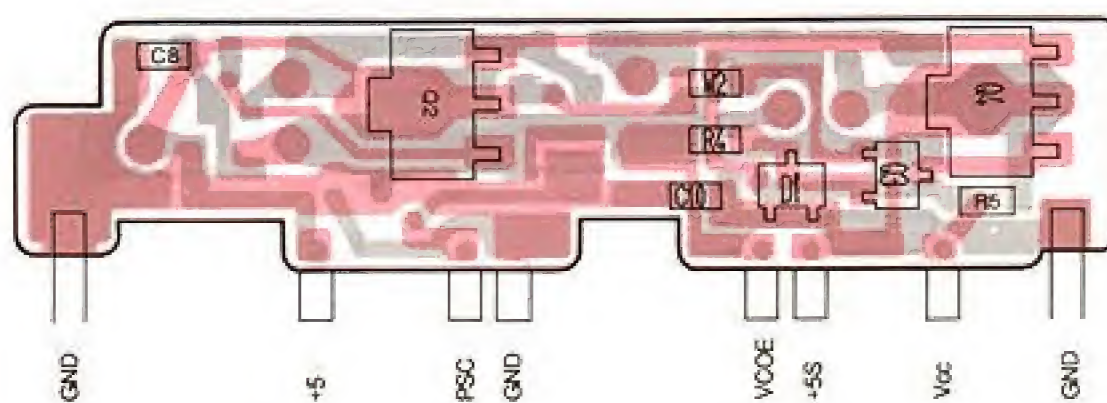
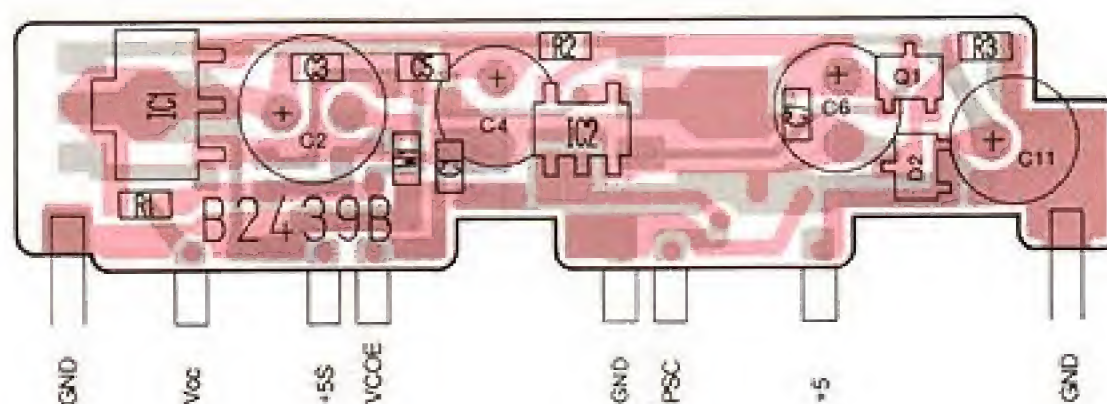
**DTA144TU**  
(Symbol: 16)



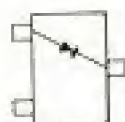
**DTC114TU T107**  
(Symbol: Q4)



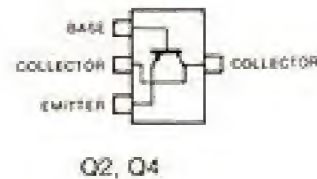
• REG UNIT



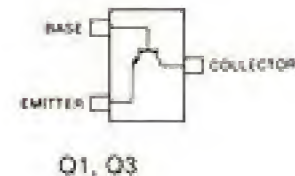
**DA114**  
(Symbol: AV)



**2SB798**  
(Symbol: DK)

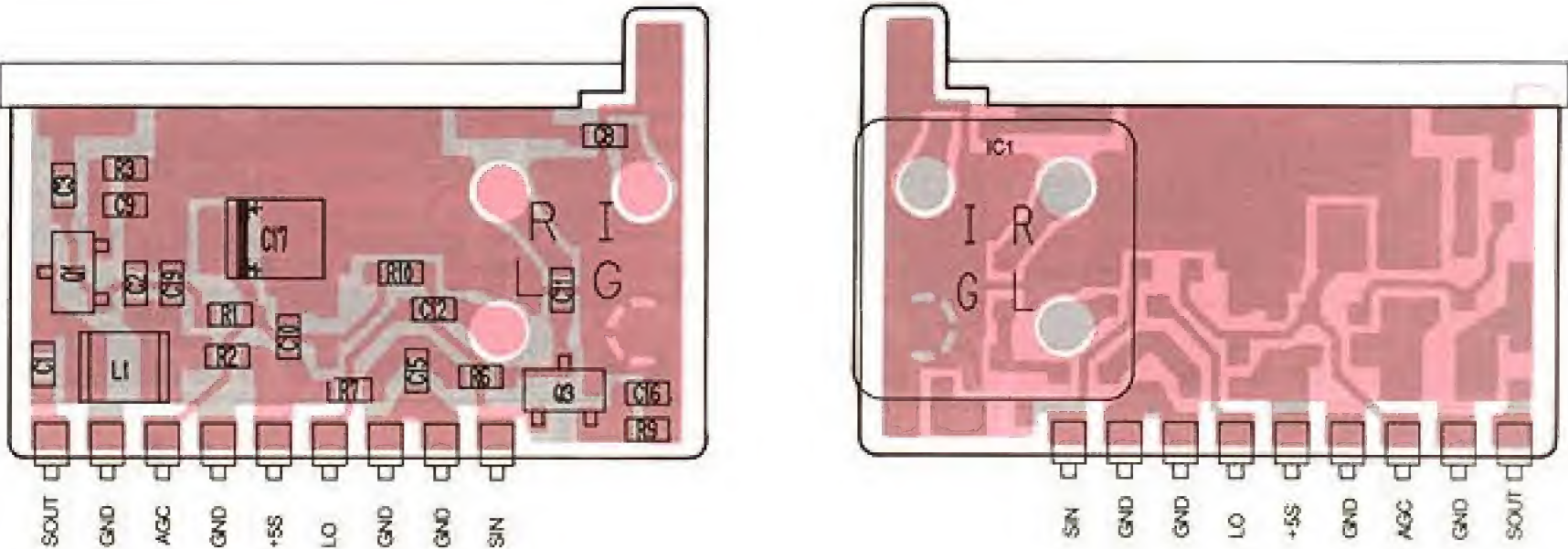


**2SC4081 S**  
(Symbol: BS)

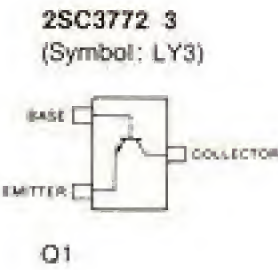
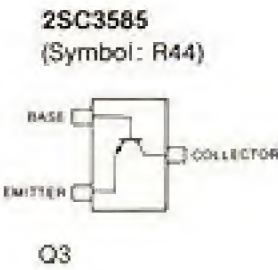
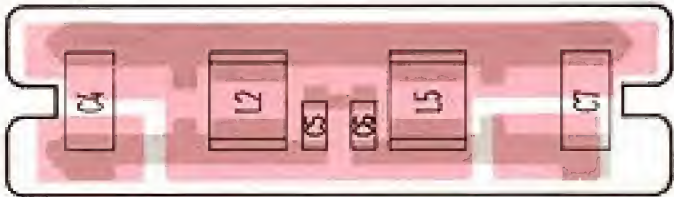




• B.P.F UNIT

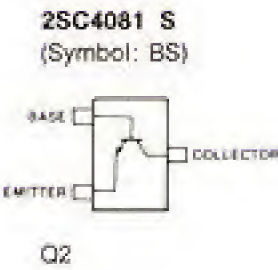
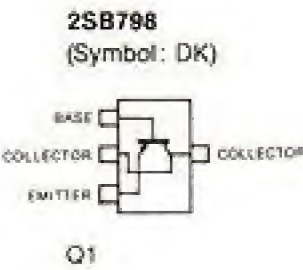
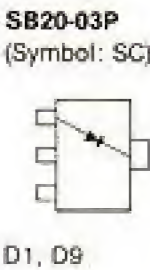
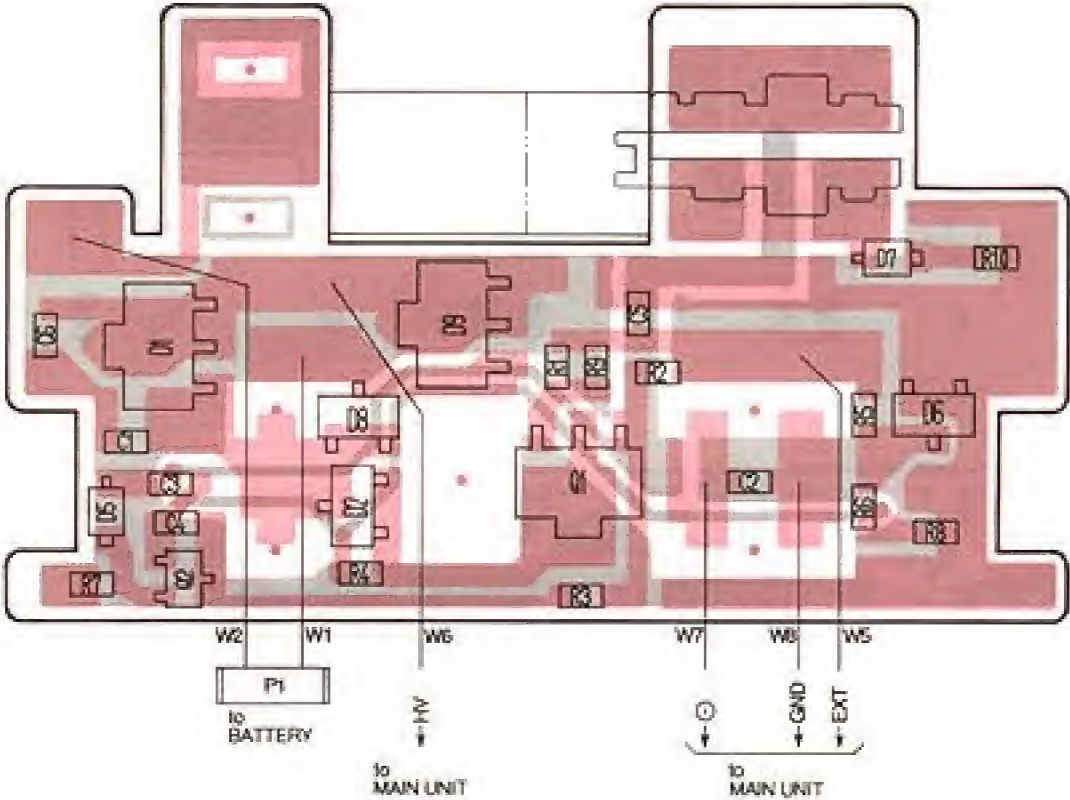


COIL BOARD

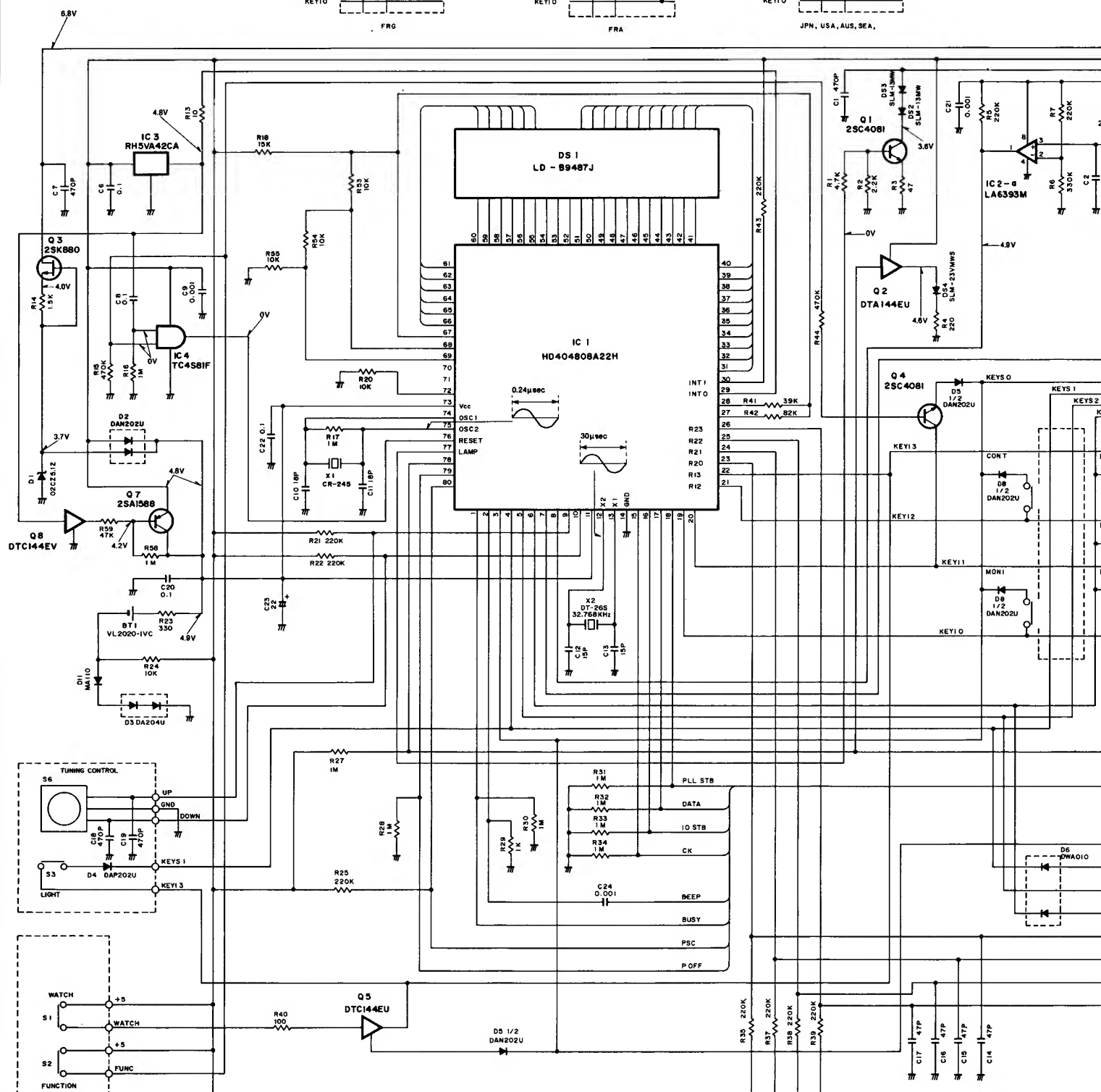
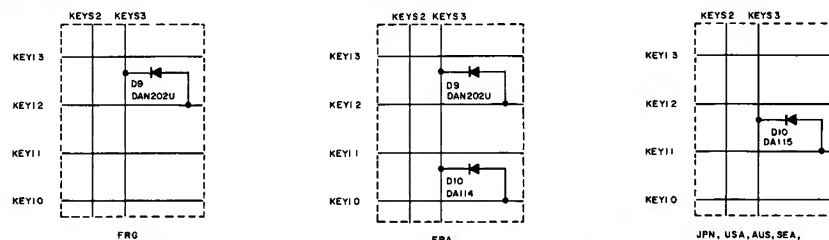


• PRT UNIT

Downloaded by  
RadioAmateur.EU



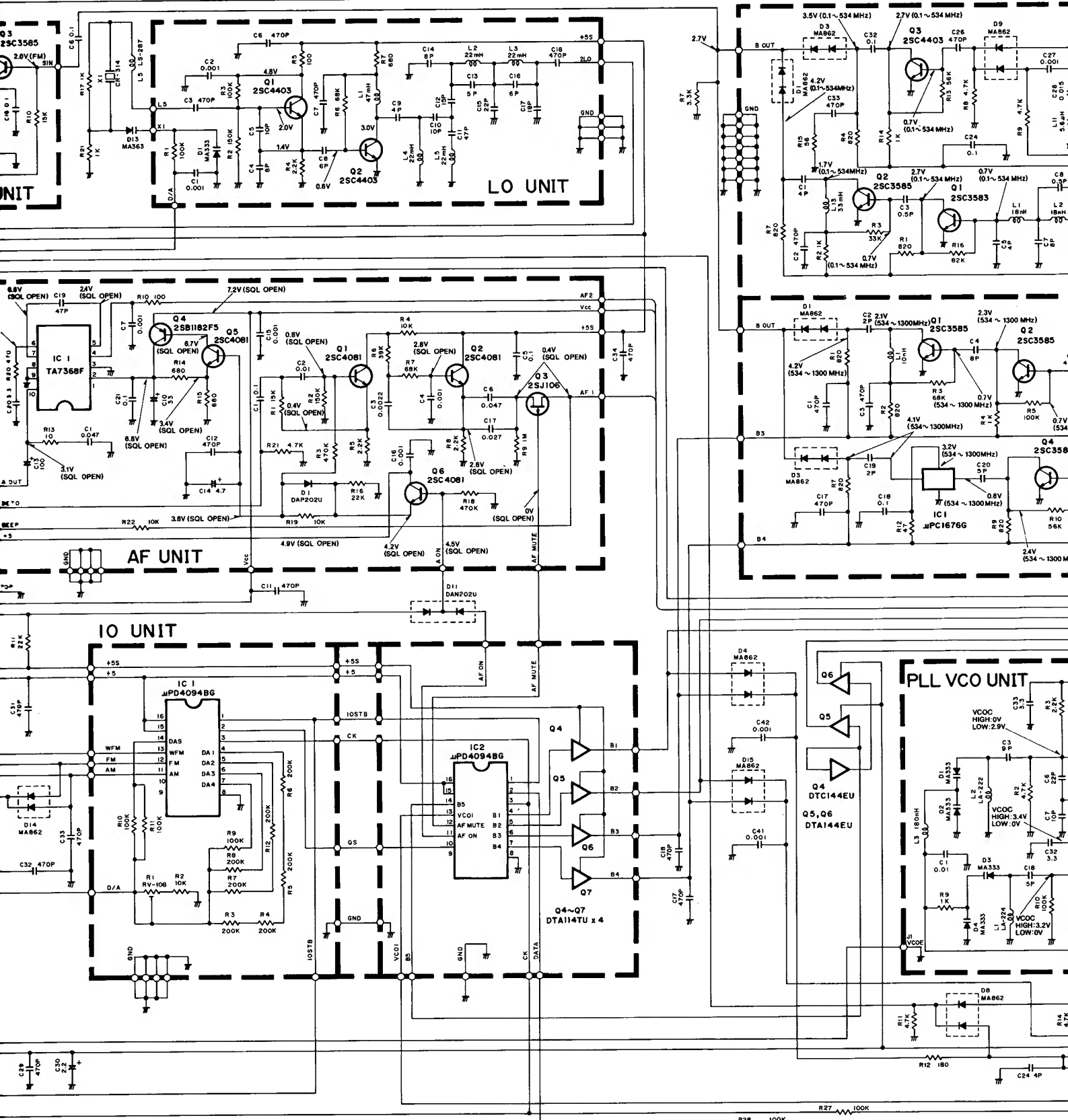
## SECTION 9 VOLTAGE DIAGRAM

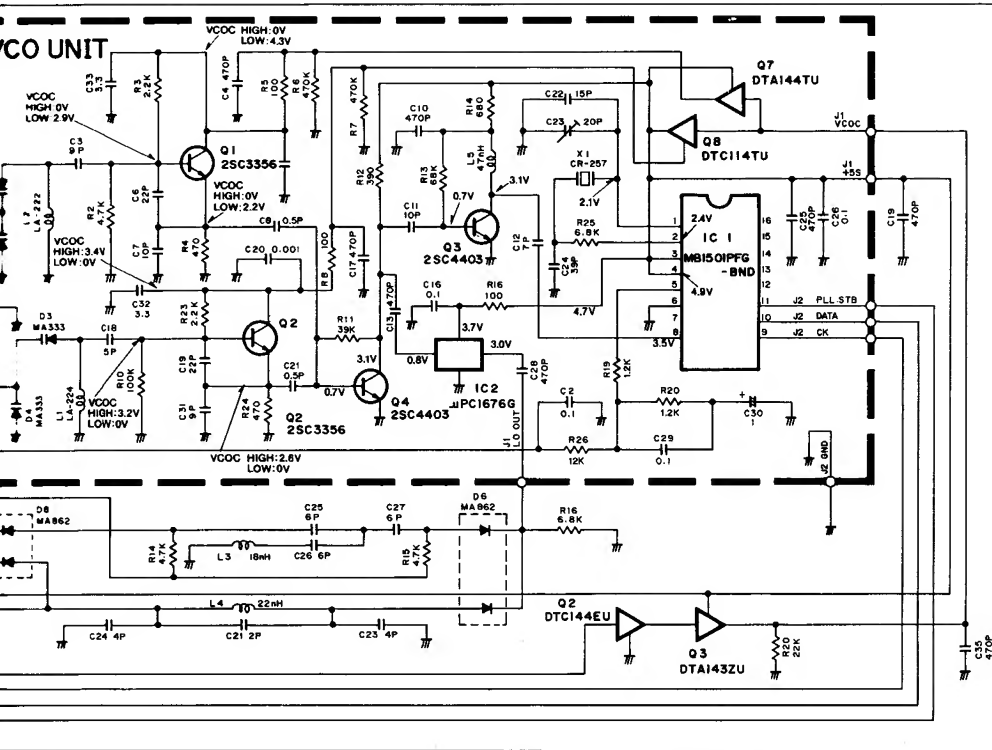
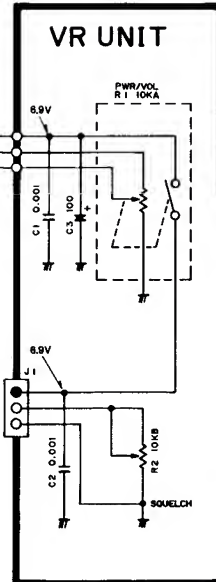
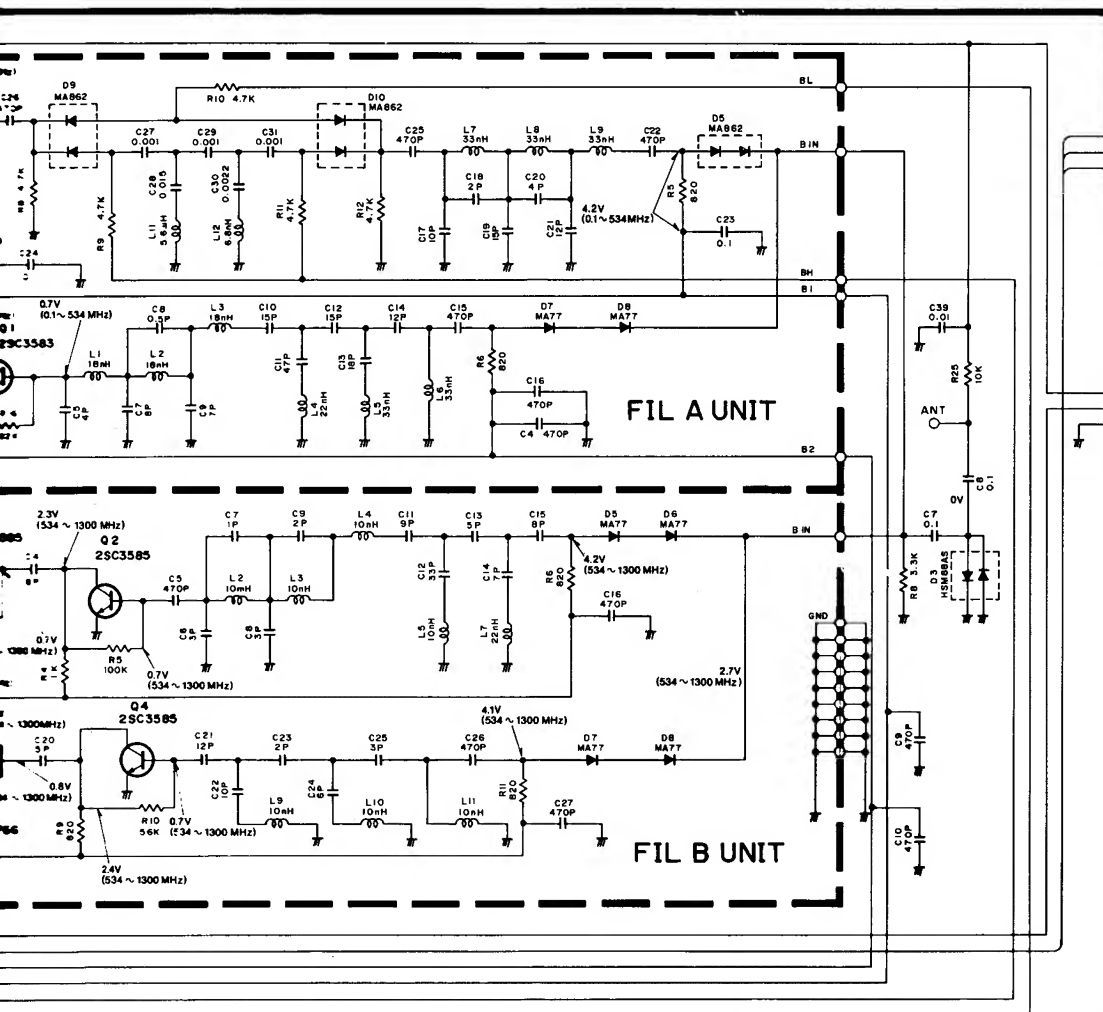












Downloaded by  
RadioAmateur.EU



## Icom Inc.

6-9-16, Kamihigashi, Hirano-ku, Osaka 547, Japan

Phone: 06 793 5301

Fax : 06 793 0013

Telex : 05277822 ICOMTR J

### Icom America Inc.

#### <Corporate Headquarters>

2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.

Phone: (206) 454-8155

Fax : (206) 454-1509

Telex : 152210 ICOM AMER BVUE

#### <Customer Service>

Phone: (206) 454-7619

#### <Regional Customer Service Centers>

18102 Sky Park South, Suite 52-B, Irvine, CA 92714, U.S.A.

Phone: (714) 852-8026

Fax : (714) 852-8716

1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349, U.S.A.

Phone: (404) 991-6166

Fax : (404) 991-6327

### Icom Canada

A Division of Icom America Inc.

3071 #5 Road, Unit 9, Richmond, B.C., V6X 2T4, Canada

Phone: (604) 273-7400

Fax : (604) 273-1900

### Icom (Europe) GmbH

Communication Equipment

Himmelgeister Str. 100, 4000 Düsseldorf 1, F.R.G.

Phone: 0211 346047

Fax : 0211 333639

Telex : 8588082 ICOM D

### Icom (Australia) Pty. Ltd.

A.C.N 006 092 575

7 Duke Street, Windsor, Victoria, 3181, Australia

Phone: 03 529 7582

Fax : 03 529 8485

Telex : AA 35521 ICOM AS

### Icom (UK) Ltd.

Unit 9, Sea St., Herne Bay, Kent, CT6 8LD, U.K.

Phone: 0227 741741

Fax : 0227 360155

Telex : 965179 ICOM G

### Icom France S.a

Zac de la Plaine, Rue Brindejonc des Moulinais

BP 5804, 31505 Toulouse Cedex, France

Phone : 61. 20. 31. 49 Fax : 61. 34. 05. 91

Telex : 521515 ICOM FRA

**Count on us!**

**Downloaded by  
RadioAmateur.EU**